NIH BUSINESS SYSTEM IMPLEMENTATION PLAN

December 28, 2000

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I. INTRODUCTION

This document provides the Implementation Plan for the NIH Business System (NBS) to the Deputy Director for Management, NIH for consideration and concurrence. In approving the NBS Business Case for Phase I, the Steering Committee adopted the recommendation that a comprehensive Implementation Plan be submitted to the Deputy Director for Management (DDM) to guide the Phase II effort and that it include the following components:

- *Organizational Structure*: This component of the Implementation Plan should include the definition of the project organization structure, detailed definitions of individual roles and responsibilities, and an approach for staffing the project.

- *Governance Plan*: The Governance Plan should include the charter for the Steering Committee, a definition of the issue resolution and escalation process, and a recommendation for the roles and responsibilities of other decision-making bodies.

- *Financial Plan:* The Financial Plan should be as comprehensive as possible, and include costs, beyond those of the system integrator and the software to be purchased, that may have been budgeted elsewhere within the National Institutes of Health (NIH). It should include the staffing and other associated costs for the project team.

- *Deployment Plan*: The Deployment Plan should define the implementation timing and associated functional scope, major tasks, and major deliverables.

- *Change Management Plan*: The Change Management Plan should be based on a stakeholder analysis, identifying stakeholder groupings and how they are impacted by the NBS deployment over time. Based on this analysis, the Change Management Plan should include a communication plan, a training plan, and a high level staff transition approach for each stakeholder grouping.

- *Project Evaluation Plan*: The final component of the Implementation Plan should define the performance measures that will be used to track and evaluate the progress of the NBS project. The Evaluation Plan should include periodic and long-term performance measures.

The Steering Committee believed that such a plan would assure that NIH's commitment of resources is based on a thoughtful consideration of actions to be taken in the design, testing, deployment, and maintenance stages.

The basic point of departure between this plan, and the Business Case submitted in June are the risks that were identified in the Business Case. To be most useful, the Implementation Plan must address and mitigate the risks that were identified. These risks are sometimes supplemented with findings that emerged from an independent literature search undertaken by the Project Management Team (PMT) as of July 2000, and interviews that they had with Project Managers of Enterprise Resource Planning (ERP) projects at several major universities. Universities specifically were chosen since it was thought that the decentralized and collegial decision-making characteristic of universities best represents the organizational and decision-making structure that exists at the NIH. Furthermore, within the public sector, implementation of integrated ERP systems has begun to occur more extensively and comprehensively at universities than in the Federal government. The results of the interviews with the university contacts are shown as Appendix A and a summary of the literature search is shown as Appendix B.

This document contains an individual section for each of the elements of the Implementation Plan noted above. In some cases, however, this Implementation Plan goes beyond that contemplated in the Business Case. For example, a Technical Plan is provided rather than a Deployment Plan; it includes a Deployment Plan but provides additional detail on the technical underpinning of the project. Similarly, the Project Evaluation Plan called for in the Business Case has been expanded to also include a description of how the project will be monitored during implementation, in addition to providing the plan for evaluating it after deployment. Finally, a section has been added to describe the acquisition strategy used to procure the Enterprise Resource Planning software and the services of a system integrator.

Each section begins with the major risks identified in the Business Case that are pertinent to that section. These risks may be supplemented with pertinent information or "lessons-learned" gleaned from the literature search or university interviews. Some risks may appear in more than one section if they are applicable. The specific proposal is then presented and the relationship of the proposal to the various potential risks is noted.

II. GOVERNANCE PLAN

   A. Risks and Lessons Learned

- Establish effective sponsorship and leadership – A sponsor is the senior program official who ultimately assumes responsibility for the project. The Program Official, who oversees the project and the activities of the Project Manager, must be highly visible and empowered to make difficult decisions that ultimately arise. The Program Official and the Steering Committee should have sufficient authority and decision-making capacity to make decisions in a timely fashion. This authority should be defined, accepted by the community, and communicated throughout the organization prior to implementation.
- Make the project the number one priority – The NIH community must understand that the NBS's impact will be far-reaching and that the project must have high priority in order to be successful. The Steering Committee must consistently articulate the project's importance. The Program Official serving as the project sponsor must be able to effectively champion the importance of the NBS to maintain momentum in decision-making and secure the necessary funding.
- Establish a clear and effective issue resolution process – This is necessary to decide issues in a timely manner. As issues arise, it is important to have a clearly defined resolution process that is timely, involves decision-makers, and includes appropriate escalation paths.
- Limit the scope of the initial implementation – Initial implementation should only include essential functionality. This will significantly decrease risk of failure while providing promised benefits in a timely fashion and will control implementation costs.
- Rather than customizing the system to current business practices, NIH should consider changing business practices to fit the system – Customization of the commercial software should be the exception. Any limited exception should be made after a complete analysis of its potential cost and its impact on the implementation schedule.
- Program leadership must drive the project and force change – The Program Official must be able to control internal pressures within the organization that may have a negative impact on the project, particularly those that would result in maintaining the status quo, and to continue to focus the organization on taking the steps necessary for successful and timely conclusion of the project.
- The project must be led by the business community, not the Information Technology (IT) community – While IT is an essential element of an ERP project, it must facilitate, not determine, the solution.

   B. Overview of the NBS Governance Plan

The proposed governance structure was developed using the principles established by the Chief Information Officer's (CIO) Board of Governors (BOG) for the management of

enterprise-wide information technology systems. These principles are consistent with the items that are listed above and are as follows:
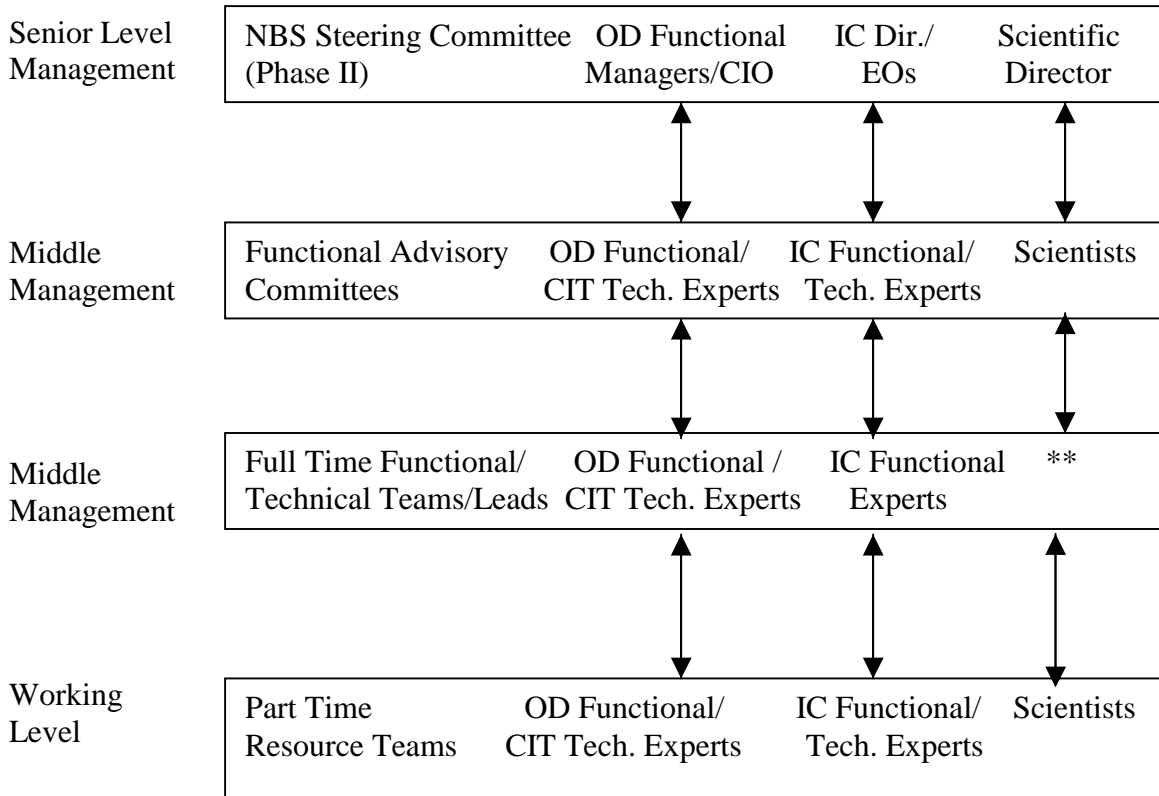
- A Steering Committee will be appointed by the NIH Director with advice from the CIO and the Program Official (i.e., the Deputy Director for Management) to review business plans where relevant, to monitor and provide advice regarding the progress of project plans, assure alignment between the business plan and the project plan, and to advise on the policy, financial, and high-level operational issues associated with the project.
- The membership of the group will be balanced with respect to organizational and community representation, will be chaired by a senior NIH official, and will include as members the CIO or his/her representative and the program official and his/her representative. Membership must include representatives of other enterprise systems that must or should interface with the system for which the Steering Committee was established.
- The group will be chartered to ensure common understanding of purpose and will establish a routine meeting schedule.

Building on this set of principles and the "lessons learned", it is proposed that governance and oversight be provided through the use of:

- An NBS Steering Committee for Phase II;
- Separate Advisory Committees for each of the functional teams that will be implementing the NBS.

The NBS Steering Committee will provide executive management oversight and decision-making. In addition, separate Functional Advisory Committees are proposed to provide a forum for the separate communities represented by distinct elements of the NBS and to provide business expertise that will be necessary for meaningful community oversight. In addition, functional teams of full-time employees of the NBS drawn from the ICs/OD and resource teams composed of IC/OD representatives, described fully in the section on staffing, are essential elements of the project's design. All of these groups interconnect so that they will form a communication link to their larger communities as well as a mechanism for problem resolution. This is depicted below and the oversight committees also are described in detail below.

It should be noted parenthetically that Phase II provides a transition from the use of the Scientist Focus Group, used in Phase I to receive scientific input, to the incorporation of scientists more directly into the implementation activities themselves. While the use of the Scientific Focus Group was invaluable, incorporation of scientists into the Functional Advisory Committees and the Resource Teams, as depicted below, in addition to service on the NBS Steering Committee itself, should provide even greater attention to the needs of scientists in the implementation phase.

Senior Level Management	NBS Steering Committee (Phase II)	OD Functional Managers/CIO	IC Dir./ EOs	Scientific Director
Middle Management	Functional Advisory Committees	OD Functional/ CIT Tech. Experts	IC Functional/ Tech. Experts	Scientists
Middle Management	Full Time Functional/ Technical Teams/Leads	OD Functional / CIT Tech. Experts	IC Functional Experts	**
Working Level	Part Time Resource Teams	OD Functional/ CIT Tech. Experts	IC Functional/ Tech. Experts	Scientists

**Since these are full-time positions in non-scientific specialties, it is assumed to be impractical for scientist participation.

NBS Steering Committee – Consistent with the BOG principles and the need for top-level support of each enterprise project, the Director, NIH, will establish an NBS Steering Committee for Phase II. It will be co-chaired by the Deputy Director for Management, the senior program official of the NIH business community. The other co-chair is the Director, National Institute on Drug Abuse, who serves as the representative of the IC Directors, the senior decision-making body at the NIH.

The charter for this committee is shown as Attachment 1 and it details both the membership of the Committee and its duties. As can be seen in this section, the Committee is comprised of senior NIH managers, and consistent with the guidance of the CIO BOG, it is representative of the major stakeholders of administrative and scientific users of the support systems that are to be incorporated into the NBS. Inspired by the lessons learned by other public sector organizations, and consistent with the principles articulated in the Business Case, the charter vests the Committee with the authority to make all policy decisions emerging from the implementation of the NBS as well as decisions that are required for timely implementation. Specific duties are listed in the charter. It should be noted that while the charter makes it clear that the Committee has oversight responsibility for both the NBS and the Enterprise Human Resource Project (EHRP), the duties that are listed in this document are those that relate only to the NBS

project. Pertinent EHRP duties will be added by the responsible officials at a later date. It is anticipated that the Committee will meet at least monthly, and probably bi-weekly at the outset.

It should be noted that the CIO Board of Governors will also provide continuing oversight at the policy level. The Project Manager will provide quarterly briefings. In addition, funding requests for the NBS project will be reviewed by the Board of Governors and then forwarded to NIH's Funding Advisory Review Board, which will provide funding recommendations to the IC Directors and the Director, NIH.

NBS Phase II Functional Advisory Committees – The Functional Advisory Committees noted above are proposed to further the participation of experts in the business, technical, and scientific communities who are not members of the functional teams but who serve in leadership positions in the OD and ICs, and to provide more detailed business and technical oversight than can be provided by the more senior managers on the NBS Steering Committee. The Co-chairs of the NBS Steering Committee will establish these advisory committees. Each individual committee will be co-chaired by an OD and IC representative and will oversee the implementation of a specific functional component. It is recommended that OD Co-chairs be the senior OD officials supervising the pertinent functional activity and be appointed by the appropriate OD functional leader serving on the NBS Steering Committee. The IC Co-chairs should be senior IC functional experts and be selected by the IC representatives on the NBS Steering Committee, in consultation with the relevant community.

The charter for these committees is shown as Attachment 2 and it details both the memberships of the committees and their duties. As can be seen from the charter, each is comprised of supervisory administrators, IT experts, and scientists representing the administrative, technical, and scientific users of the individual functional components of the NBS – Financial Management, Property, Travel, Service and Supply Fund, Research and Development (R&D) Contracts, and Acquisition/Supply. The Intramural Research (IR) representatives of the NBS Steering Committee should nominate the scientific representatives. Similarly, the NBS Extramural Research (ER) Steering Committee members and the CIO should nominate the ER and IT representatives, respectively and the Equal Employment Opportunity (EEO) and Human Resources (HR) Steering Committee members should nominate their counterparts. Finally, the NBS Steering Committee should approve the overall membership of each Committee.

Each committee's duties include the approval of specific elements of the Implementation Plan that are unique to its specific function and each is charged with making recommendations to the NBS Steering Committee on policy issues pertinent to its specific function. Finally, and possibly most importantly, members serve as a communication link with their larger community to assure communication on the needs of the community as well as the status of the project. It is anticipated that these committees will meet at least bi-weekly, and weekly in the initial stages of the project.

<u>Issue Resolution Process</u> – The NBS Steering Committee Charter represents a compact between the NIH and the Steering Committee, authorized by the Director, NIH that provides it with the authority to resolve most, if not all, issues of a policy nature that will arise during the implementation of the NBS. Under normal circumstances, many of these issues otherwise might have been resolved through the traditional, but more elongated, NIH decision-making process. For example, a policy issue may normally be debated within the functional community (e.g., the Budget Officers), then proceed to the Executive Officers, and finally be decided by the IC Directors. Even if the issue is resolved at a single meeting at each step along the way, and even if the item could be added to the agenda of the next possible meeting, the sequential nature of the process and the bi-weekly schedule of meetings suggests that a decision made in this fashion would require a minimum of 6 weeks, under the best of circumstances.

This Implementation Plan assumes that the traditional, but more time-consuming, decision making process may be necessary for an exceptional decision, but that most issues should ultimately be decided by the Steering Committee. To do otherwise has a significant financial consequence. This plan projects an implementation period of 3½ years and staff and System Integrator costs will require $44M. Since most steps and the required decisions are sequential, the cost of delayed decision-making is an extended timeframe and additional System Integrator and staffing costs. A delay of 6 months, for example, as a result of the cumulative effect of a slower decision-making process, would add another $5.2M to the cost of the project, at a minimum.

To assure a decision-making process that is representative of the more traditional decision-making process at NIH, the NBS Steering Committee has been specifically constructed so that it includes senior representatives of each of the major policy-making groups within the NIH who would be considering such issues – Executive Officers and the DDM, Scientific Directors, EPMC, and the CIO. In addition, the Steering Committee is co-chaired by an IC Director. Inclusion of a DHHS representative will help to communicate progress and to assure that decisions are made consistent with current knowledge of the Department's requirements.

To attain wide consideration of issues emerging as a result of the NBS, the governance process has been established so that issues are thoroughly examined by subject matter experts and that policy implications have been examined by members of the pertinent community prior to presentation to the Steering Committee for resolution. Normally, issues that emerge with the working groups will be vetted with the resource team, which is composed of working level members representing the functional community; other issues may be raised by an IC. Regardless, issues that are specific to a particular function will be referred to the Functional Advisory Committee after sufficient staff work has been performed either by the work groups or by the Project Management Team. The Functional Advisory Committee has the opportunity to consult with the larger community as appropriate and then makes a recommendation to the NBS Steering Committee, which makes the final decision.

Background: The objective of Phase II of the NIH Business System project is to design, develop and deploy an Enterprise Resource Planning system that will satisfy the requirements established by functional work groups during Phase I. Achievement of this objective will, in turn, enable NIH to meet its business goals and support the scientific mission of the Agency. The guiding principles of this implementation, consistent with the NIH-approved Business Case, are:

- *No customizations* – Any limited exception should be made only after analysis of cost and schedule impact, and approval by the Steering Committee.
- *Limited Number of Interfaces* – Initial interfaces should only be built to connect the NBS with other NIH-wide enterprise systems.
- *Empowered Governance* – The governance structure should be representative, and possess sufficient authority to resolve all issues that emerge, including approval/disapproval of exceptions to the policy limiting customization, and approval of any systems replicating or enhancing capabilities of the NBS.
- *Assignment of the Best-and-Brightest to the Project* – In addition, key members of the implementation effort should be assigned on a full-time basis.
- *Phased Deployment* - The Implementation Plan will consider whether this deployment should be phased by IC or by function.
- *Rigorous Budget Management* – ICs should receive timely notification of costs and the timing of resource needs, and discipline should be exercised to control costs and set priorities.
- *Comprehensive Change Management* – This strategy should be comprehensive, recognizing that most problems that emerge during the implementation of ERP products are due to inadequate attention to these issues.
- *Continuous Project Evaluation* – This review mechanism should allow project revision or termination, at intermediate points, should it be necessary.

Purpose: The NBS Steering Committee, to be established by the Director, NIH, is a group of senior NIH managers representing the major stakeholders of administrative functions and scientific users of the administrative support systems that are to be incorporated into the NBS. This Committee will be co-chaired by the Deputy Director for Management (DDM) and an Institute or Center (IC) Director and will oversee the implementation of the NIH Business System (NBS) and the Enterprise Human Resource Program (EHRP). This committee is comprised of senior level representatives from all relevant NIH communities and, consistent with the experience of other public sector organizations, is vested with the authority to make all policy decisions emerging from the implementation of the NBS or that are required so that its implementation may proceed in a timely manner. Specifically with regard to the NBS, the Committee will:

- Approve the NBS Implementation Plan, and any changes to this plan. However, any funding requests must be reviewed by the CIO Board of Governors and then

the NIH Funding Advisory Review Board, which makes funding recommendations to the IC Directors and the NIH Director.

- Approve the composition of NBS Functional Advisory Committees and Functional Team Leads.
- Resolve any policy issue that arises during the development and implementation of the NBS that will require a change in NIH policy in any of the 7 functional areas included in the NBS.
- Resolve any differences that may arise between NBS teams, or between functional and technical teams that cannot be resolved by the participants.
- Approve or disapprove, after thorough review of cost and schedule implications, proposals submitted by an IC/OD Office or the NBS Project Management Team for:
  - ➢ Customizing the NBS ERP software;
  - ➢ Establishing interfaces or extensions between NBS and other systems beyond those listed in the NBS Business Case; and
  - ➢ Expanding the approved scope of the project when it has cost or schedule implications.
- Approve the NBS Performance Management Plan, monitor the development of the performance measures, and oversee their implementation.
- Continually monitor the cost and schedule of the project via an "earned value" analysis performed by PMT staff, and take necessary action should it appear that the project will exceed its budget or the length of its schedule by 10%.
- Receive regular reports from the Project Manager on the assessments made by the Independent Validation and Verification (IV&V) contractor.
- Make a decision prior to the yearly extension of the software and system integrator contracts as to whether or not to continue to proceed based on the earned value analysis, performance measures, and the reports by the IV&V contractor.
- Serve as a conduit for communicating the purpose of this project, and its progress, and being its advocate to the larger NIH community as well as preparing the larger community for changes that may be required in performing existing business practices.
- Resolve any cross-cutting issues that may arise during the development of the EHRP and the NBS.

Membership
Consistent with the guidance from the CIO Board of Governors, the Steering Committee is representative of each of the communities impacted by this Enterprise-wide System and also contains the Project Managers of other NIH-wide Enterprise Systems that must interface with the NBS. In addition to the DDM and an IC Director who will serve as co-chairs, membership will be as follows:

- The NBS Project Manager (non-voting)
- The NIH Chief Information Officer
- Director, Office of Administration
- Director, Office of Research Services

- Director, Office of Budget
- Director, Office of Financial Management
- 4 IC Executive Officers
- 2 Intramural Research representatives (SD/OIR)
- 2 Extramural Research representatives (EPMC/OER)
- Director, Office of Equal Opportunity
- Director, Office of Human Resources Management
- DHHS Representative
- Project Manager, EHRP (non-voting)
- Project Manager, ERA (non-voting)

Membership will be limited to principals or a single, designated representative with voting rights.

Quorum
A quorum for conducting business and making recommendations will consist of two-thirds of the voting membership.

Terms
Because Phase II of the NBS will involve each major administrative function, members will be asked to serve the entire implementation period, expected to last 3½ years.

Subcommittees
The Committee may call upon special advisors, assemble ad hoc sub-committees, and convene conferences, special meetings, etc. as needed. Ad-hoc participants will be selected as needed to ensure appropriate input from the NIH community, to foster development of creative solutions, and to optimize NIH's support for the Committee's activities. Subcommittees and advisors will report their findings and recommendations to the Steering Committee.

Support
The DDM will provide management and support services to the Committee with help from the ICs as requested.

Roles and Responsibilities
Co-chairs:
- Conduct Committee meetings;
- Report Committee decisions to the NIH Director and senior NIH scientific and management officials; and
- Appoint the members of the Functional Advisory Committees.

Executive Secretary:
- Distribute agendas;
- Establish meeting schedules and locations;
- Prepare and distribute meeting schedules and minutes; and

- Coordinate logistical services for the Committee as needed.

Committee Members:
- Attend meetings as scheduled and participate in deliberations; and
- Chair or participate in subcommittee work as assigned.

Meetings
The Committee will meet at least on a regular monthly basis; bi-weekly meetings may be required at the outset. A routine time, date, and place will be established by the Co-chairs at the Committee's first meeting. The Co-chairs may also call meetings at other times as needed. Meetings will be open.

Reports
Meeting minutes will serve as record of Committee activities and decisions and will be posted on an NIH web site. The Committee will determine when formal reports are necessary.

Approved:

_____
Director, NIH   Date

Background: The objective of Phase II of the NIH Business System project is to design, develop and deploy an Enterprise Resource Planning system that will satisfy the requirements established by functional work groups of Phase I. Achieving this objective will, in turn, enable NIH to meet its business goals and support the scientific mission of the agency. The guiding principles of this implementation, consistent with the NIH-approved Business Case, are:

- *No customizations* – Any limited exception should be made only after analysis of cost and schedule impact, and approval by the Steering Committee.
- *Limited Number of Interfaces* – Initial interfaces should only be built to connect the NBS with other NIH-wide enterprise systems.
- *Empowered Governance* – The governance structure should be representative, and possess sufficient authority to resolve all issues that emerge, including approval/disapproval of exceptions to the policy limiting customization, and approval of any systems replicating or enhancing capabilities of the NBS.
- *Assignment of the Best-and-Brightest to the Project* – In addition, key members of the implementation effort should be assigned on a full-time basis.
- *Phased Deployment* – The Implementation Plan will consider whether this deployment should be phased by IC or by function.
- *Rigorous Budget Management* – ICs should receive timely notification of costs and the timing of resource needs, and discipline should be exercised to control costs and set priorities.
- *Comprehensive Change Management* – This strategy should be comprehensive, recognizing that most problems that emerge in the implementation of ERP products are due to inadequate attention to these issues.
- *Continuous Project Evaluation* – This review mechanism should allow project revision or termination, at intermediate points, should it be necessary.

Purpose: The NBS Phase II Functional Advisory Committees, established by the Co-chairs, NBS Steering Committee, are comprised of supervisory administrators, IT experts, and scientists representing administrative, technical, and scientific users of the individual components of the NBS – Financial Management, Property, Travel, Service and Supply Fund, R&D Contracts, and Acquisition/Supply. Each individual committee will be co-chaired by an OD and IC representative and will oversee the implementation of a specific functional component. Specifically, each committee will:

- Approve the Implementation Plan developed by the functional team.
- Approve the overall workflow design developed by the functional team.
- Approve the Deployment Plan developed by the functional team.
- Identify and provide a recommendation to the NBS Steering Committee on any issue that arises during the development and implementation of the NBS in its functional area that will require a change in NIH policy.

- Monitor the implementation of its individual function and alert the Project Manager of any issue that might have a negative budgetary or scheduling impact.
- Provide a recommendation to the NBS Steering Committee, after thorough review of cost and schedule implications, on any proposal pertinent to its functional area submitted by an IC/OD Office or the NBS Project Management Team for:
  - ➢ Customizing the NBS ERP software;
  - ➢ Establishing interfaces or extensions between NBS and other systems beyond those listed in the NBS Business Case; and
  - ➢ Expanding the approved scope of the project when it has cost or schedule implications.
- Serve as a conduit for communicating the purpose of this project, and its progress, and being its advocate to the larger NIH community (e.g., Budget Officers, Intramural and Extramural Administrative Officers, etc.), as well as preparing the larger community for changes that may be required in performing existing business practices.

Membership
Each Committee will be comprised of:

- Co-chairs, OD/ IC representative;
- An equal number (2-4) of OD and IC functional experts;
- 2-4 Intramural Research scientists;
- An Extramural Research representative;
- A Chief Information Officer representative;
- Functional Team Leads (non-voting);
- Equal Employment Opportunity representative; and
- Human Resources representative.

Membership will be limited to principals or a single, designated representative with voting rights.

Quorum
A quorum for conducting business and making recommendations will consist of two-thirds of the voting membership.

Terms
Because Phase II of the NBS will involve each major administrative and scientific support function, members will be asked to serve the entire implementation period, expected to last 3½ years.

Subcommittees
The Committee may call upon special advisors, assemble ad hoc sub-committees, and convene conferences, special meetings, etc. as needed. Ad-hoc participants will be selected as needed to ensure appropriate input from the NIH community, to foster development of creative solutions, and to optimize NIH's support for the Committee's

activities. Subcommittees and advisors will report their findings and recommendations to the Steering Committee.

Support
The NBS Functional Teams will provide management and support services to the Committee as needed.

Roles and Responsibilities
Co-chairs:

- Conduct Committee meetings; and
- Report Committee actions to the NBS Project Manager, the NIH Functional Manager, and its larger NIH-wide community.

Executive Secretary:

- Distribute agendas;
- Establish meeting schedules and locations;
- Prepare and distribute meeting schedules and minutes; and
- Coordinate logistical services for the Committee as needed.

Committee Members:

- Attend meetings as scheduled and participate in deliberations; and
- Chair or participate in subcommittee work as assigned.

Meetings
The Committee will meet on a regular weekly basis. A routine time, date, and place will be established by the Co-chairs at the Committee's first meeting. The Co-chairs may also call meetings at other times as needed. Meetings will be open.

Reports
Meeting minutes will serve as record of Committee activities and decisions and will be posted on an NIH web site. The Committee will determine when formal reports are necessary.

Approved:

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Co-chairs, NBS Steering Committee   Date

III. ORGANIZATION AND STAFFING PLAN

A. *Risks and Lessons Learned*

- <u>Assign the best and brightest employees to the NBS project</u> – Identify the best team members to implement the NBS. Successful implementations require community involvement and a commitment to the future. Those assigned should work full-time on the project.
- <u>Use a Systems Integrator</u> – Skilled contractor staff should complement the internal implementation team with their knowledge and experience. One strategy is to "pair up" the system integrator staff that is skilled in software implementation, with members of the NIH implementation team who are skilled in NIH policies and procedures. This expertise, however, should be an adjunct resource to the in-house team.
- <u>Use integrated implementation teams</u> – Integrated teams will ensure broad OD, IC, and technical coverage.
- <u>Co-locate the staff</u> – The functional and technical teams, the system integrator staff and the Project Management Team should all be co-located.
- <u>The project must be led by the business community, not the IT community</u> – While IT is an essential element of an ERP project, it must facilitate, not determine, the solution.
- <u>Plan for the transition of the implementation team to post-implementation roles</u> – A structure and a multi-disciplinary team needs to be developed to manage the system changes, updates, and house a help desk after implementation.

B. *Overview of the NBS Organizational and Staffing Plan*

1. <u>Organization and Staffing – Formal Structure</u>

The organizational structure of the NBS project is displayed below. The discussion that follows will identify the specific functions of members of the organization and will detail how this structure relates to the risks and lessons-learned that are highlighted in Section A above.

NBS Project Management Organizational Structure

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                        ┌─────────────────────┐
                        │   Project Manager   │
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        ┌───────────────┬──────────┼───────────────────────┐
┌───────────┐  ┌───────────┐  ┌───────────┐      ┌──────────────────┐
│ Functional│  │ Technical │  │  Project  │      │      Change      │
│  Manager  │  │  Manager  │  │ Integrator│      │   Management     │
│   (NIH)   │  │   (CIT)   │  │(Contractor)│     │    Director      │
└─────┬─────┘  └─────┬─────┘  └─────┬─────┘      │     (NIH)        │
      │              │              │            └────────┬─────────┘
┌───────────┐  ┌───────────┐  ┌───────────┐    ┌──────────┴──────────┐
│ Functional│  │ Technical │  │Functional │ ┌───────────┐ ┌───────────────┐
│   Team    │  │   Team    │  │    and    │ │ Training  │ │ Communication │
│  Members  │  │  Members  │  │ Technical │ │Specialist │ │  Specialist   │
│   (NIH)   │  │   (CIT)   │  │   Team    │ │  (NIH)    │ │    (NIH)      │
└─────┬─────┘  └─────┬─────┘  │  Members  │ └───────────┘ └───────────────┘
      │              │        │(Contractor)│
      └──────┬───────┘        └───────────┘    ┌───────────────┐
   ┌────────────────────┐                      │ Change Mgmt.  │
   │   Resource Teams   │                      │  Generalist   │
   │    (NIH-OD/IC)     │                      │    (NIH)      │
   └────────────────────┘                      └───────────────┘
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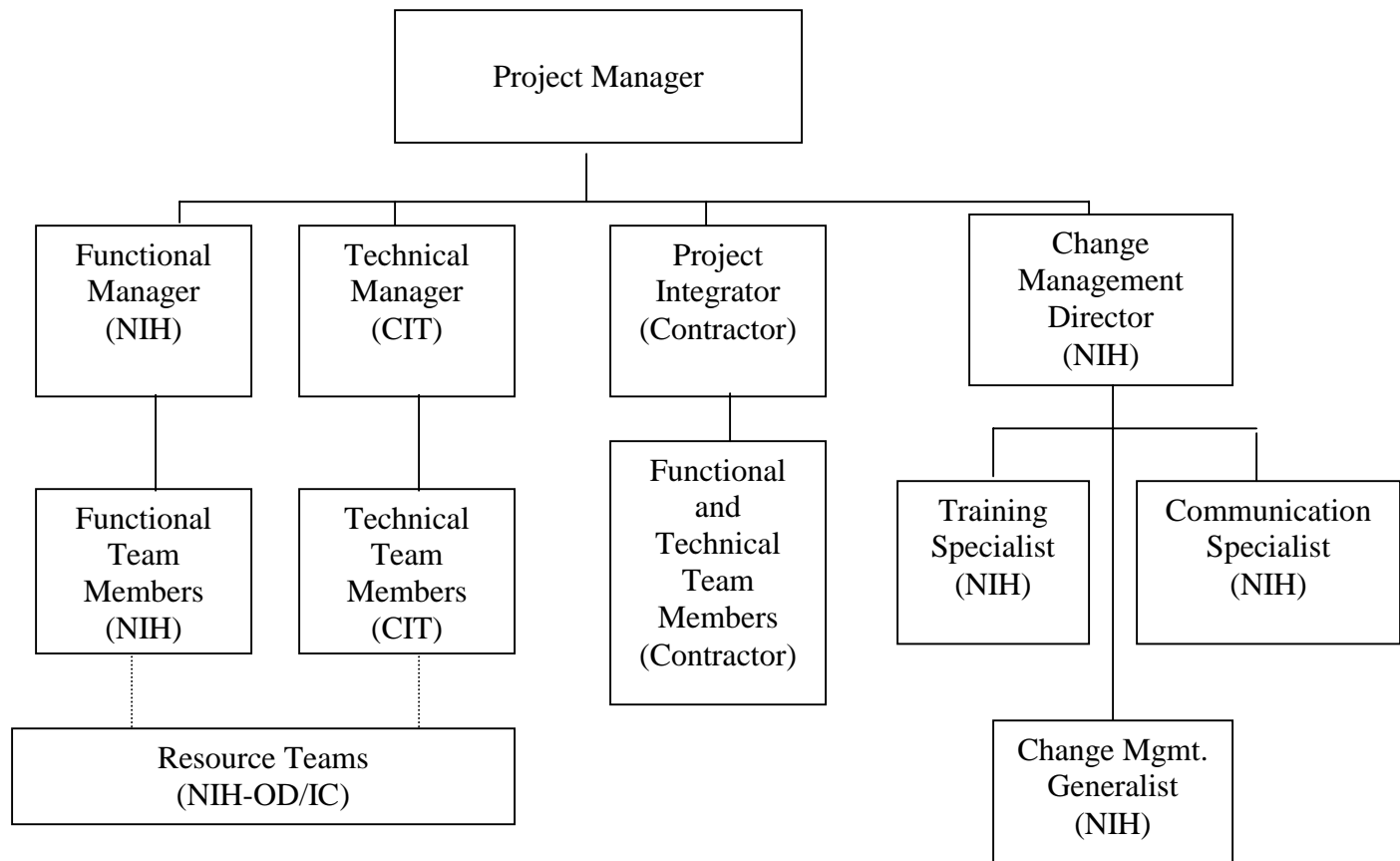
This represents the traditional display of an organization with the formal lines of supervisory authority. It will be headed by a Project Manager who is a Federal employee. As shown by this organization chart, the Project Manager will oversee the activities of the NIH staff responsible for the actual design and implementation of the NBS and the contractor staff who will be assisting them. In addition, the Project Manager will oversee the activities of the NBS change management program.

2. Organization and Staffing – Working Model

Before describing the detailed staffing plan, it is important to note that while this organizational chart accurately displays formal lines of authority, it does not sufficiently display how the project will actually operate. While it is difficult to display how an organization actually works without leading to a misunderstanding with regard to the

formal lines of authority, the following diagram attempts to portray the team approach that will be fostered in the operation of the NBS.

The points conveyed in this model are as follows:

- The leadership of the NBS project comes unambiguously from the Project Manager – it is a business project, not a technical project.
- The Functional Manager, the Technical Manager, the Project Integrator and the Change Management Director generally will operate as a team reporting to the Project Manager.
- NIH and contractor functional staff will operate as a team; similarly NIH-CIT and contractor technical staff will operate as a team.
- Functional, Technical and Change Management staff will coordinate their activities, operating as a team.
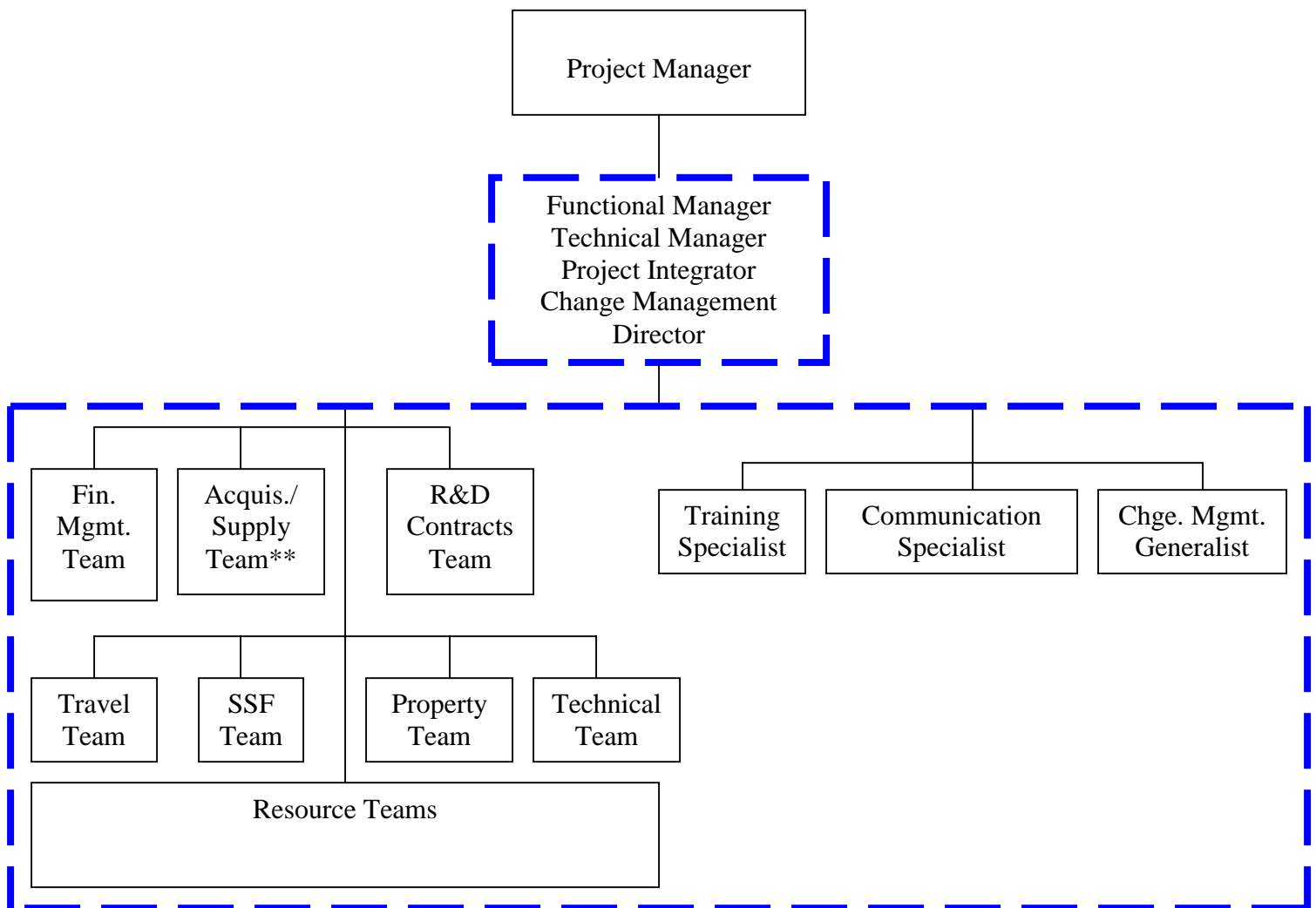
** The combination of these functions is dictated by the interrelationships that exist between these functions in an integrated software product.

In sum, the NBS project actually will function as an integrated and co-located staff of NIH and contractor functional and technical staff and NIH change management staff under the leadership of the NIH Project Manager.

Project Management
A Federal Project Manager, a representative of the business community, will manage the project on a day-to-day basis. A full description of duties is provided in the position description that is shown as Attachment 3. This position description was developed utilizing the Appendix to the CIO Board of Governors Management Principles for NIH Enterprise-wide Systems entitled Authority and Responsibility of a Project Manager for an NIH Enterprise-wide System (A Framework).

The primary management team that will assist the Project Manager in overseeing the project and executing her directions consist of a Federal Functional Manager, a Federal Technical Manger, a Federal Change Management Director and a Project Integrator that is providing expertise and assistance by contract to the project. A listing of the entire management team and the period for which that position will be needed is shown as Attachment 4. It should be noted that some of the positions listed in this Attachment will extend beyond the implementation phase. These positions will be incorporated into the organization that will manage the NBS after implementation is complete and the role of this organization will be described fully under the heading of "Competency Center" below.

Work Teams
The dotted box around the lower half of the chart displays an integrated team approach at the working level. There will be six functional workgroups (usually one functional workgroup for each of the functions of the NBS; however, supply and acquisition specialists will work as one team because of the interrelationships that must be embedded in the software for these functions in an integrated administrative and scientific support system) and a technical workgroup. Each of these workgroups will consist of a complement of full-time NIH and contractor staff. The NIH employees that comprise the functional teams will be selected to assure a balance between representatives of the ICs and the OD.

The number of individuals serving on each of these teams is shown in Attachment 4. The number on each team varies depending on the complexity of the task for that functional activity. In securing the Federal staff, the NBS Project Manager will pursue a strategy of identifying the best and brightest in a functional area for each team from nominees by OD functional managers and IC Executive Officers. Proposed Team Leads for each of these teams will be presented to the NBS Steering Committee for their endorsement. A description of the duties of these functional teams is provided as Attachment 5. It is anticipated that each of these individuals will serve full-time. The recruitment letter requesting nominees for these positions is provided as Attachment 6.

A somewhat different strategy will be followed with regard to the staffing of the technical team. Because NIH must continue to maintain the ADB while the NBS is being built, it

became increasingly evident during the development of this Implementation Plan that a strategy different than that proposed in the Business Case must be developed. The CIT and the NBS project must, in effect, share some of the scarce technical personnel for both systems. In addition, the technical development of the NBS must be consistent with overall CIT architecture and CIT must provide support to the project during and after implementation. It is therefore proposed that CIT employees staff the Federal complement of the project's technical team. In addition to these staff, the CIT will also provide operational support to the NBS during the period of implementation and deployment. The full complement of positions devoted to the technical team is displayed in Attachment 4 and Attachment 7 provides a brief description of these positions.

Resource Teams
It is recommended that the IC Executive Officers and the OD functional Office Directors nominate an individual for each functional team to serve as its representative on a part-time basis. The CIO in conjunction with the ICs would also nominate IT representatives to serve on each of these teams to ensure that the IT community is represented. Scientists will also be included on these teams. These subject matter experts will serve as a resource to the work teams, meeting with them on at least a bi-weekly basis to receive a status report on the work team's activities and to provide advice, from a working level perspective, on the full range of issues that are facing the work team and their specific functional communities. Discussion items will include, for example, the proposed design of the NBS, process scripts, the need for customization, planned training of users, acceptance criteria, acceptance test results, readiness assessment, the deployment schedule, data conversion, the quality of user documentation, NBS interface issues, issues of importance to the scientific community, and the identification of workflow issues in ICs or OD offices. In addition, the individual members will be expected to communicate NBS plans and progress to their peers and other appropriate personnel. Finally, they may be asked to serve as an ad hoc resource on an as-required basis in selected tasks, e.g., assisting in data conversion, information gathering, etc.

Change Management
Personnel staffing the Change Management function will be skilled in the disciplines of human resources, training, and communications. While technically employees of the Project Management Team, they will function as adjuncts to the functional and technical teams so that they can best assist in providing timely communication, developing training plans, and coordinating the Human Resources services that are an essential part of implementing a project of this nature. They will interact with the functional and technical teams as a resource on an as-needed basis, will participate in weekly briefings of the Project Manager by the functional and technical team leads, and will participate in each of Functional Advisory Committee meetings. A listing of the positions for Change Management is provided in Attachment 4 and their activities will be described more fully in Section V, Change Management Plan.

Competency Center
Following the completion of deployment of the NBS modules, a Competency Center will be established to provide continuing support to the NBS. A multi-disciplinary team needs

to be developed to manage the system changes, updates, and a user help desk function after implementation. A more detailed description of the activities that will be undertaken through the Center and its proposed staffing levels are shown as Attachment 8.

It is envisioned that selected members of the functional and technical teams would staff this Center although it is possible that some may be new hires. Those positions that are thought to be necessary are listed in Attachment 4. It is anticipated that the Competency Center would be organizationally located within the OD Office of Management, in order to maintain a business focus for the project.

NIH Business System Project Manager
(ES-XXX)

## I.	Introduction – NIH Business System

The National Institutes of Health (NIH) is internationally recognized as the leader in the research, prevention, detection, diagnosis, and treatment of disease and disability that afflicts the human population. NIH's mission is to uncover new knowledge that will lead to better health for everyone. NIH works toward that mission by conducting and supporting research performed in the intramural and extramural communities. NIH would be unable to maintain its world-class structure in research without highly efficient and effective administrative support. The NIH must have a business system that provides careful financial accounting and administrative data management and can quickly evolve to accommodate legislatively mandated changes in government oversight. Implementing a new state-of-the-art process for managing key resources is crucial to the continued success of the NIH as an effective steward of the resources it has been allocated.

The overall objective of the NIH Business System (NBS) is to facilitate the scientific mission of the National Institutes of Health and enable administrative/scientific support that is cost effective and provides accurate and timely information. The scope of the NBS includes seven business or "functional" areas currently included in the Administrative Data Base (ADB): acquisition, travel, commercial accounts, supply, Research and Development contracting, property, and financial management. The NBS will interface with NIH's ADB, Data Warehouse, Information for Management, Planning, Analysis, and Coordination (IMPAC) I and II, NIH Status of Funds Database, and appropriate NIH Service and Supply Fund modules. The NBS will also interface with the Department of Health and Human Services (DHHS) Payroll System, DHHS Payment Management System, DHHS EHRP, and the United States Department of the Treasury Systems. In addition, an interface will be built to the Intramall, as appropriate, consistent with the e-procurement strategy developed by the NIH CIO.

Core financial systems used by Federal agencies must comply with specific guidance such as OMB Circular A-127, which requires agencies to utilize a single, integrated financial management system and OMB Circular A-130 which mandates the use of "off the shelf" software to meet agency financial management needs and the Joint Financial Management Improvement Program (JFMIP) requirements.

Management of the implementation of the NIH Business System (NBS) will be accomplished consistent with the principles guiding the management of NIH enterprise systems (ES), and approved by the CIO Board of Governors. The Deputy Director for Management (DDM) and Chief Information Officer (CIO) will appoint the Project Manager (PM). This individual will not be within the supervisory chain of the DDM's organization.

II. Duties and Responsibilities

The Project Manager shall:

- Serve as the focal point for managing the design and implementation of the NBS; the development of life-cycle and budgetary plans; the execution of the approved plans; the monitoring of milestones and schedules as well as budget expenditures; and the mediation and coordination of activities throughout all levels of the NBS organizational structure.
- Report to the DDM and the IC Director who co-chair the NBS Steering Committee and who will monitor the progress of the NBS to ensure that the project is compliant with NIH policy and procedure.
- Refer all complex and/or controversial issues that arise from the work groups or NIH community at large regarding the NBS, to the DDM and Steering Committee. These issues would generally include those that require review at the policy level.
- Work effectively with the CIO to ensure that the future direction of the NBS project is consistent with the plans for information technology at NIH and other trans-NIH systems.
- Work effectively with the Project Managers of other trans-NIH systems, as needed, to ensure integration between systems thereby minimizing any duplication in programming and application development.
- Oversee a comprehensive program of change management, including the development of communication and training plans and resolution of human resource issues that arise during implementation of this system.
- Develop performance indicators and oversee a program of continuous improvement using these performance indicators.
- Appoint collaborative workgroups to maximize input into the development of future applications.
- Ensure that functional groups have the technical and administrative resources needed to provide input into the current and future designs of applications that they utilize.
- Serve as a non-voting member of the NBS Steering Committee.
- Provide status reports to DHHS officials, as required.
- Seek advice from the NBS Steering Committee to ensure that the plan for the NBS is aligned with the financial, technical, and other resources necessary, to implement the plan.
- Direct the overall plan for the development and implementation of the NBS, providing leadership in areas that may prove to be controversial or complex involving budget, policy, and other issues that could hinder the progress of implementation of the NBS.
- Provide reports regarding the status of the NBS to the CIO Board of Governors, as requested.
- Promote a diverse membership of the NBS staff that mirrors the NIH community being served.

Factor 1 –Knowledge Required for the Position

- Expert knowledge of the business processes at the NIH.
- Expert knowledge of the tenets of project management, including organizational

skills, communication skills, and supervisory skills.
- Expert skill in presenting information to stakeholder groups, explaining project data and complex concepts, in a clear and concise manner.

Factor 2 - Supervisory Controls
The incumbent delegates assignments or projects with established objectives, priorities and deadlines. S/He evaluates completed work for compliance with program goals and objectives, appropriateness of recommendations or conclusions, relevance of support material, consistency, technical soundness, and timeliness. The incumbent addresses problems and deviations' providing leadership and guidance particularly in unusual situations that do not have clear precedents.

Factor 3 –Guidelines
The incumbent must tailor and adapt applicable business practices and authorities from external and government sources to the NBS project, in compliance with Federal rules and regulations.

Factor 4 – Complexity
Assignments involve evaluating prepared information and reports, identifying and analyzing issues, and developing recommendations to resolve substantive problems of effectiveness and efficiency of agency work operations in a program or program support setting.

Factor 5 - Scope and Effect
The incumbent uses established methods, practices, and criteria to identify, study, and recommend solutions for resolving conventional problems or questions. The incumbent's work affects the adequacy, reliability, quality, and timeliness of project management as it pertains to the NBS.

Factor 6 – Personal Contacts
The incumbent regularly meets and communicates with persons representing organizations and groups from the internal and external business communities i.e. functional working groups, NIH Institutes and Centers, DHHS, other Federal agencies, and Office of Management and Budget (OMB).

Factor 7- Purpose of Contacts
The purpose is to advise stakeholders and other members of the external and internal communities regarding progress of issues pertinent to the NBS project. It is also to counsel others regarding interpretation of program evaluations and implementation of recommendations on organizational improvements and/or program effectiveness. Issues such as organizational conflict, and those with competing objectives or resource problems may be encountered.

Factor 8 – Physical Demands
No special physical qualifications are required to perform the work of this position. The incumbent does sedentary work. There may be some walking, standing, bending,

carrying of light items, or driving an automobile. No special physical effort or ability is required to perform the work.

Factor 9 – Work Environment
Work is performed comfortably in an adequately lighted and ventilated office setting.

Position	NIH or Contractor	Duration
Project Management		
Project Manager	NIH	10/2000 - 9/2008
Office Manager	NIH	10/2000 - 6/2004
Administrative Assistant	NIH	1/2001 - 9/2008
Functional Manager	NIH	10/2000 - 6/2004
Technical Advisor	NIH	10/2000 - 6/2004
Management Advisor	NIH	10/2000 - 6/2004
Change Management Director	NIH	1/2001 - 6/2005
Training Specialist	NIH	1/2001 - 6/2004
Communications Specialist	NIH	1/2001 - 6/2004
Change Management Generalist	NIH	10/2000 - 6/2004
Subtotal, NIH	10 NIH	
Principal Manager *	Contractor	1/2001 - 6/2004
Project Manager	Contractor	1/2001 - 6/2004
Administrative Manager	Contractor	1/2001 - 6/2004
Technical Manager	Contractor	1/2001 - 6/2004
Subtotal, Contractor*	4 Contractor	
Total, Project Management*	10 NIH/4Contractor	

*Contractor Principal represents only .1 FTE

Position	NIH or Contractor	Duration
Functional Work Teams		
Financial Mgmt.		
Functional Specialist	NIH	1/2001 - 9/2008
Functional Coordinator	Contractor	1/2001 - 6/2004
Functional Specialist	NIH	1/2001 - 9/2008
Functional Specialist	NIH	1/2001 - 12/2002
Technical Support	Contractor	1/2001 - 6/2004
Technical Support	Contractor	1/2001 - 4/2002
Subtotal, Financial Mgmt.	3NIH/3Cont.	
Property		
Functional Specialist	NIH	1/2001 - 9/2008
Functional Coordinator	Contractor	1/2001 - 6/2004
Functional Specialist	NIH	1/2001 - 12/2002
Technical Support	Contractor	1/2002 - 6/2004
Subtotal, Property	2NIH/2Cont.	

Travel		
Functional Specialist	NIH	1/2001 - 9/2008
Functional Coordinator	Contractor	1/2001 - 6/2004
Functional Specialist	NIH	1/2001 - 12/2002
Technical Support	Contractor	1/2001 - 6/2004
Subtotal, Travel	2NIH/2Cont.	
SSF		
Functional Specialist	NIH	1/2001 - 9/2008
Functional Coordinator	Contractor	1/2001 - 6/2004
Functional Specialist	NIH	1/2002 - 6/2004
Technical Support	Contractor	1/2002 - 6/2004
Subtotal, SSF	2NIH/2Cont.	
R&D Contracts Team		
Functional Specialist	NIH	1/2001 - 9/2008
Functional Specialist	NIH	1/2001 - 6/2004
Functional Coordinator	Contractor	1/2001 - 6/2004
Subtotal, R&D Contracts	2NIH/1Cont.	
Acquisition/Supply Coordinator	NIH	1/2001 - 6/2004
Acquisition/Supply Coordinator	Contractor	1/2001 - 6/2004
Station Supp. Functional Spec.	NIH	1/2001 - 9/2008
Station Supp. Functional Spec.	NIH	1/2001 - 9/2008
Station Supp. Functional Spec.	NIH	1/2001 - 6/2004
Station Supp. Funct. Coord.	Contractor	1/2001 - 6/2004
Station Support Funct. Coord.	Contractor	1/2001 - 6/2004
Supply Functional Specialist	NIH	1/2001 - 9/2008
Supply Functional Specialist	NIH	1/2001 - 6/2004
Supply Functional Coordinator	Contractor	1/2001 - 6/2004
Subtotal, Acquisition/Supply	6NIH/4Cont.	
Documentation Writer	NIH	8/2001 - 9/2008
Documentation Writer	Contractor	1/2001 - 6/2004
Documentation Writer	Contractor	4/2001 - 11/2002
Subtotal, Documentation Writers	1NIH/2/Cont.	
Total, Functional Teams	18NIH/16Cont.	

Technology Team:

Role	Type	Dates
Technical Manager	NIH	1/2001 - 9/2008
NBS Database Admin. 1	Contractor	1/2001 - 6/2004
Oracle ERP Configuration Specialist	NIH	1/2001 - 9/2008
Applications Developer 1	Contractor	1/2001 - 6/2004
Database Programmer 1	NIH	1/2001 - 9/2004
Database Programmer 2	NIH	1/2001 - 9/2003
Database Programmer 3	NIH	1/2001 - 9/2004
Database Programmer 4	Contractor	4/2001 - 9/2003
Database Programmer 5	Contractor	4/2001 - 9/2003
Database Programmer 6	Contractor	4/2001 - 3/2003
Database Programmer 7	Contractor	4/2001 - 3/2003
Workflow Specialist	NIH	1/2001 - 9/2008
Oracle ERP Specialist	Contractor	1/2001 - 6/2004
Change Control Coordinator	Contractor	1/2001 - 6/2004
Applications Developer 2	NIH	1/2003 - 9/2008
Applications Developer 3	NIH	10/2003 - 9/2008
NBS Database Admin. 2	NIH	10/2003 - 9/2008
Total, Technology Team	9 NIH/8 Cont.	

Introduction

The NIH Business System (NBS) will be designed, developed and tested as a fully integrated facility that supports seven functional areas and interfaces with other major NIH and Departmental systems. Individual functions will be deployed on a phased basis. This presents an overview of the tasks that the functional teams will undertake either individually or in conjunction with other members of the overall NBS team.

Design and Configuration of the Purchased System

- Complete necessary training.
- Determine the use of the software for each function; identify business rules to be applied; and develop an overall functional design.
- Identify those design changes that have policy implications for resolution by the Steering Committee; periodically summarize progress to date and present it to the Steering Committee.
- Collaborate with Change Management staff; identify those modifications that have change management implications and refer them to Change Management specialists for action.
- Meet with the Functional Advisory Committee to present the functional design and to assure that all business rules are being accommodated (an iterative process).
- Finalize the NBS design and review it with the appropriate functional community and with other groups as appropriate, and then submit it to the Functional Advisory Committee and the Steering Committee for approval.
- Configure each functional system and apply the business rules.
- Test each function to assure that the configuration is accurate and that business rules are being applied properly.
- Report test results to each functional team.

Workflow

- Develop a proposed workflow for each function and identify all interfaces with other functions; submit workflow to the Functional Advisory Committee for approval.
- Assure that all other functional interfaces are identified (an iterative process).
- Refer any change to current workflow to the Change Management staff to coordinate any necessary change management actions.
- Apply workflow requirements.
- Test each function to determine that business rules and workflow operate as expected.
- Report the results of the application of workflow to functional teams.

Customization

- Assess the software's capability to determine that the only alternative to satisfying a high priority requirement is to develop a customized approach.
- Refer all customization proposals and an assessment of the likely impact on cost and schedule to the Functional Advisory Committee for review and recommendation and to the Steering Committee for decision.
- Upon approval, develop a proposed approach to satisfying the customization requirement.
- Develop the customized software using the ERP tool-set.
- Collaborate with Change Management staff so that they may address pertinent issues.

System Interfaces

- Define all existing integration with remaining ADB function(s) or other systems, as required.
- Collaborate with Change Management staff so that they may address pertinent issues.

Pre-Deployment

- In collaboration with Change Management staff, develop technical training materials and user documentation for each function to be deployed.
- Develop acceptance test criteria.
- Translate the acceptance test criteria into test scripts for the function to be deployed.
- Collaborate with CIT technical support staff to establish the test environment.
- Collaborate with Change Management staff so that they may address pertinent issues.

Deployment

- Provide access to all authorized NIH users of each new function.
- Collaborate with Change Management staff so that they may address pertinent issues.

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Memo to: See Below
From: Deputy Director for Management, NIH
Subject: Staffing the Implementation Phase of the NIH Business System (NBS)

The purpose of this memorandum is to provide OD and IC administrative leaders the opportunity to help identify the 17 business experts in six functional areas of the NBS who will lead NIH teams in the implementation of the Oracle ERP product. The team leads will be assisted in this effort by a system integrator who will be selected soon. The integrator solicitation was issued September 26, 2000 and an award is anticipated by early November. We must move quickly to identify the implementation leadership so that work can begin in January 2001.

A leadership role with the NBS project offers an exciting opportunity for individuals who are experienced in NIH business practices and who appreciate the challenge of building future practices and the supporting electronic infrastructure. Obviously, ICs losing one of these individuals to the project will experience a short-term loss, but will have the long-term gain of having participated in the reshaping of the future. ERP experiences in other organizations have taught that the individuals who serve in leadership roles will be highly prized at the end of the project because of their in-depth understanding of business practices, related processes, and the new supporting system, therefore, participation can be a career enhancing activity. Nevertheless, the NIH commits to the principle that all individuals will be guaranteed a position commensurate to their rank at the end of the project.

Also, other organizations that have undertaken similar ERP efforts strongly encourage an aggressive set of incentives to attract highly prized individuals. Examples are the opportunity for specialized career training at the conclusion of the project in an area related to public administration or management or the opportunity for sizable performance bonuses at the successful completion of specific project milestones. The success of the project depends on the quality of its leadership, and I am asking that you assist in championing the project to attract our best and brightest business leaders and consider the incentives that are possible as a result of participation in the project.

As documented in the NBS Phase 1 Business Case, the seven business areas pertinent to ERP functionality are: financial management, acquisitions, property, supply, commercial accounts, travel, and service and supply fund. The organizational structure used to identify system requirements in those areas during that phase included 7 separate teams each led by a set of co-chairs, one representing the NIH OD perspective and the other representing the ICs'. That model was successful in terms of providing the right blend of perspectives and participation across NIH, and it will be continued for the implementation phase.

For Phase 2, the functional area groupings will be modified slightly to better address the integration aspects of the ERP product. The functional areas will be the following six: Financial Management (inclusive of Commercial Accounts), Property, Travel, SSF, R&D Contracting, and Acquisition/Supply. A staffing chart for these areas is attached (Attachment 1). You will notice several key points:

- All positions are full-time for the length of their need;
- The length of need varies. For some positions, the length extends beyond the 3-4 year implementation phase into the post-implementation phase to handle maintenance operations in a "competency center"; other positions end at the conclusion of the implementation period. The individuals staffing the competency center may vary from those staffing the implementation phase. We are looking at the moment for those to lead the implementation phase; once the system is operational, the permanent staff of the competency center will be selected. Some of these are likely to be from the implementation group but it is not possible to predict that now.
- The Financial Management function includes Commercial Accounts which is represented by the third functional specialist in that listing and who will serve in a staff role to the two co-leads;
- The R&D Contracts group is new and reflects the special needs of that community in the context of the system's development; and,
- The Acquisition/Supply "grouping" includes two co-leads for each of these functions and a Coordinator to orchestrate the overall work of the groups. A Purchase Card functional specialist is included who will serve in a staff role to the Acquisitions co-leads.

While each of the functional areas differ in their content, all the co-leads will be doing similar activities during the Phase 2 period. Of importance is that these individuals will be serving in leadership roles within the functional areas of the ERP product and must be experienced in the business area itself, but also in leading others in the completion of a product, multi-tasking, time management, and teamwork. These individuals are likely to be senior experts and must be recognized in their communities as such, as well as for their creativity, objectivity and fairness. A generic description of the co-lead activities is shown in Attachment 2. Note that it is NOT necessary for these individuals to be experienced in IT disciplines. Technical expertise will be provided by the system integrator and CIT technical staff.

At least two personnel mechanisms exist for assigning individuals to the project, i.e. details or formal reassignments. The mechanism to be used and how this will be done will be negotiated with each individual and their organization. The authority to grant three-year details will be sought by OHRM from OPM for this project. Home organizations, choosing a detail option and needing to replace the detailed individual for the term of the detail will be reimbursed from the NBS budget where salary costs have been budgeted.

These positions, numbering only 17 across NIH, are the full-time leaders/developers of the ERP implementation. Other forms of community participation are also planned that will assist those selected for these leadership positions. Each set of co-chairs will receive policy oversight by an advisory committee, consisting of managers in that business area who will be appointed by the NBS Steering Committee. This group will assure further community participation, assist in the communication of the project's progress, and formulate policy options, as necessary for the NBS Steering Committee's ultimate resolution. Further, each set of co-chairs in the six functional areas will assemble resource groups consisting of individuals who possess hands-on knowledge of the business process and who will represent your organization's perspectives on the details of the implementation effort. These individuals will provide working-level advice and may possibly assist in the actual configuration of the software via committee work as needed.

For the moment, the highest priority is to identify the leadership; solicitation for other participants will be coming under separate cover at a later date. As you know, this project is of the highest importance to the NIH business community and its support of the NIH's research mission. As difficult as it may be to nominate key players for these roles, we will all gain in the long run via their expert contributions. Please take the time to consider nominees and either submit names to Colleen Barros, NBS Project Manager, or call her with nominations or questions by November 17.

 Your cooperation is appreciated.

Tony Itteilag
Deputy Director for Management, NIH

Attachments

    Addressees:
    NIH Executive Officers
    Director, Office of Administration
    Director, Office of Budget
    Director, Office of Finance
    Director, Office of Research Services

cc: Director, Office of Human Resource Management

Technical Manager

Responsibilities include high-level design of technical solutions, definition of proposed technology, and integrity of cross-functional design. In the role of technical team lead, assigns and prioritizes tasks and is responsible for the management of the technical team. Provides technical advice to the Project Manager through the Director, DECA. Individual should be an experienced Project Manager with sufficient mastery of technical issues related to application development and should have experience managing important technical application development efforts on behalf of the government.

Database Systems Administrator

Responsibilities include overall management of the database(s), including structural design, change control, new table creation, and script execution. The incumbent will participate fully in the following:

1. Manages the physical database(s) and all instance creation/deletion.
2. Manages database performance.
3. Database tuning.
4. Manages database availability, integrity, recoverability, backup and disaster recovery.
5. Troubleshoots at the database level.
6. Manages load balancing within the server.
7. Manages database security including database user authentication and authorization.
8. Manages growth of the database.
9. Manages version control including potential effect on the application.
10. Provides advice regarding application-induced performance issues.
11. Works closely with database developers.

Oracle ERP Configuration Specialist

Responsibilities include identification and development of interface requirements with several systems including the CAS and ADB during the phased deployment of its functions to the NBS, the Payment Management System, DHHS Payroll, etc. He/she will also have primary responsibility for the configuration of the ERP system via vendor-supplied tools. Position requires extensive knowledge of existing NIH business systems, workflow and rules.

Applications Developer

Has responsibility for the configuration of ERP system via vendor-supplied tools. Position requires extensive knowledge of Oracle tools. Responsible for working directly with the Oracle ERP Configuration Specialist and Workflow Specialist on a daily basis to assist with configuration, workflow programming and other technical issues and to ensure comparability between requirements and the technical capabilities to implement these requirements. He/she must interpret emerging functional requirements in terms of

technical feasibility, and suggest technical features and capabilities that may stimulate generation of new functional requirements.

Database Programmer
Responsibilities include the integration/interface of ERP and other enterprise systems, historical data conversion, testing, deploying and supporting Oracle database-stored procedures and functions. Developers must have extensive knowledge of relational databases and be able to develop server side programs.

1. Develops back-end scripts and procedures.
2. Assists with data migration.
3. Understands and follows change control procedures.
4. Assists in development of disaster recovery processes.
5. Performs application troubleshooting.
6. As necessary, designs and develops customized procedures.

Oracle ERP Specialist
Responsibilities include the development of interface, integration and historical data conversion requirements. Position requires expert level knowledge of Oracle ERP as well as a mastery of systems analysis principles and techniques, the interrelationships of multiple IT disciplines, enterprise architecture, and project management principles to lead efforts to capture the business requirements of a systems development project through the use of industry standard tools and methodologies. He/she defines and translates business requirements into detailed technical specifications; determines effect on architecture and infrastructure needed to support the effort; outlines the sequence and phases of the project and all potential approaches and systematically evaluates and makes recommendations.

Workflow Specialist
Responsible for identifying approval chains, routing lists, clearances, notification requirements and other workflow requirements within and among the various functions of the NBS, creates the overall enterprise workflow and, in a user liaison role, advises the users in methods for adjusting workflow to suit specific organizational requirements. Must have experience in using the workflow features of the selected ERP system.

1. Analyzes business processes for workflow content.
2. Advises on changes or improvements to workflow.
3. Configures, tests and maintains workflow tools within the ERP application.
4. Assists in training users in workflow analysis and setup.

Change Control Coordinator
Responsible for the integrity of all changes to the application including network, operating systems, hardware, application software and database upgrades. Ensures that all changes are coordinated, tested, and properly implemented.

1. Oversees all change control policies and procedures.
2. Assures that all components follow adequate change control procedures.

3. Coordinates and implements all changes, upgrades and corrections.
4. Assures that all components follow adequate backup and disaster recovery procedures.

The Competency Center serves as the "continuing support" arm of the NBS, and provides the knowledgeable link between the NIH business community and the NBS following full implementation. It will be organizationally located within the Office of Management, is composed of both functional and technical staff and its Director reports to the DDM.

Support provided by the Competency Center includes the following:

- Business Process Design – In this role, serves as the resource for resolving business process-related issues, including modification and enhancement requests, training and documentation.
- NBS Maintenance – Routinely reviews and assures the accuracy of NBS production results and when appropriate, develops program fixes; coordinates the scheduling and implementation of ERP vendor software changes and the implementation of system upgrades; and following appropriate approvals, develops custom software to satisfy specific NIH requirements.
- Help Desk – Provides NBS user assistance by way of a help desk. The help desk offers daily assistance with questions and problems that arise from the user community.
- Audit Trail – Develops the data archiving strategy and maintains the audit trail for all NBS functions.
- Communication – Serves a dual role by interacting with the NIH business community and the ERP vendor. In its role with the business community, plans and implements change, and identifies unmet requirements for possible inclusion in the NBS. As the central source for ERP vendor communication, assures that issues and problems are resolved effectively and participates with the vendor in identifying NIH requirements that may have government-wide application. Also attends ERP user conferences and seminars.
- Training – Is comprised initially of a select number of skilled personnel who implement the various NBS functions. To assure that these skills are maintained, personnel must continually upgrade their knowledge of the ERP product and of IT in general. Personnel also interact with training staff to advise on system enhancements and plan training curricula.
- Documentation – Serves as the keeper of NBS technical and user documentation. In this role, coordinates with the ERP vendor to assure that documentation keeps pace with software upgrades and that NIH business rules and any facilities that are unique to the NIH are included in the latest version.

This plan assumes that the Competency Center becomes operational at the conclusion of implementation (6/2004) and the proposed staffing levels are as follows:

Position	NIH FTE's				
	FY 2004	**FY 2005**	**FY 2006**	**FY 2007**	**FY 2008**
Director, Competency Center	0.25	1.00	1.00	1.00	1.00
Administrative Assistant	0.25	1.00	1.00	1.00	1.00
Change Mgm't. Coordinator	0.25	0.75	0.00	0.00	0.00
Functional Specialists (9)	2.25	9.00	9.00	9.00	9.00
Documentation Writer	0.25	1.00	1.00	1.00	1.00
Technology Lead	0.25	1.00	1.00	1.00	1.00
Oracle ERP Configuration Specialist	0.25	1.00	1.00	1.00	1.00
Database Programmer (2)	0.50	0.00	0.00	0.00	0.00
Database Administrator	0.25	1.00	1.00	1.00	1.00
Applications Developer (2)	0.50	2.00	2.00	2.00	2.00
Workflow Specialist	0.25	1.00	1.00	1.00	1.00
Total, Competency Center	5.25	18.75	18.00	18.00	18.00

IV. TECHNICAL PLAN

A. Risks and Lessons Learned

- <u>Use a phased deployment approach and establish a contingency plan</u> – Implement sequentially, rather than implementing the NBS across all ICs and functions simultaneously. A phased approach avoids exposing the entire NIH to the success or failure of the NBS. Phased deployment also minimizes the number of temporary interfaces to the ADB and other systems that will be displaced. In addition to phased deployment, a contingency plan that outlines a fall-back strategy in the event of failure is essential in further minimizing exposure.
- <u>Limit the scope of the initial implementation</u> – Include only essential functionality initially. This will significantly decrease risk of failure while providing the promised benefits in a timely fashion. Organizations usually implement the basics first, and then phase in enhancements and refinements after the operations environment has stabilized.
- <u>Minimize the number and complexity of interfaces</u> – The project should focus on establishing only essential data transfers at first to provide a stable environment.
- <u>Select " bolt-ons" (additional software to enhance the total product) from business partners of the prime ERP vendor</u>.
- <u>Clearly define ownership of data and error correction mechanisms</u> – Many interfaces allow data to co-exist in more than one database. Defining data ownership assures that updates to the data are coordinated and controlled by one source and that updates to other instances of the same data are synchronized with an update at the source. A carefully crafted error correction mechanism, whether manual or automatic, will assure that data is synchronized.
- <u>Minimize the risk associated with the need to convert large amounts of data by adhering to the following principles</u>:
  - ➢ Establish and communicate a detailed conversion plan.
  - ➢ Begin conversion early in the process.
  - ➢ Minimize the amount of data to be converted.
  - ➢ Perform manual conversions whenever possible.
  - ➢ Test conversion programs extensively.
- <u>Test extensively</u> – While implementing ERP revolves around simulating and validating business rules using software, interfaces need to be tested rigorously for both technical integrity and functionality.

B. Overview of the NBS Implementation/Deployment Plan

<u>Phased Deployment</u> - The NBS is proposed for a 3½ year phased implementation and deployment. Attachment 9 displays the sequence of the design and deployment of each

function.[1] It is assumed that implementation will begin on January 1, 2000. The start date and the implementation time period are contingent on several actions beyond the direct control of the NBS Project Team. Slippage of any of these items will necessarily alter the time schedule and, consequently the cost of the project. Key among these are:

- Personnel decisions regarding the staffing of the technical and functional teams must be made so that the individuals can commence their training by January 1.
- Funds must be available to the NBS in the amounts listed in the Financial Plan that is provided in this document.
- If the NBS project is to incorporate an NIH-wide eProcurement strategy into the NBS deployment, such a strategy must be developed by CIT by the beginning of Phase II Implementation to assure integration into the overall system design and configuration.
- The Office of Management (OM) must have a plan in place to resolve property capitalization and depreciation issues, and to synchronize General Ledger and inventory values. Each of these must be completed prior to the deployment of the pertinent function or the implementation will be delayed.
- A complete human resources database must exist in the EHRP prior to deployment of the travel and property functions. This will allow modification of the Oracle-developed interface with PeopleSoft software, the conduct of the necessary testing, and the preparation for acceptance test and deployment of these functions consistent with the deployment schedule. If it does not exist at that time, an interface with the existing IMPACT system, which is not budgeted, must be created.

Attachment 10 provides a more detailed listing of the activities that will be undertaken to deploy the NBS. However, some of the key elements of the deployment strategy are summarized below.

Deployment by function, rather than IC, has been selected primarily because most of the processes included in the NBS are NIH-specific, rather than IC-specific. For example, all NIH components use the same procurement system regardless of whether service is provided centrally or through a decentralized procurement office; all use the same central property system; the same accounting system, etc. Similarly, the basic flow of transaction documents is consistent throughout the NIH. When a requisition is created locally, it automatically creates a commitment in the accounting system when it is approved. The requisition is also automatically forwarded to a central purchasing function where a purchase order is created. When the purchased items are received locally, an accrual is established to expense the items and if any delivered item is considered accountable property, a preliminary property record is established in the central property system. Finally, when the invoice is received, it is matched against the purchase order and receiving information before a payment can be made. Each of these actions is organizationally and functionally dependent on the other and triggers the same set of

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[1] Design refers to careful specification of each module, the inputs, outputs and interactions with other modules. Deployment refers to placing the module into service.

actions, regardless of the IC that originated the action. Given this commonality and interdependence, deployment by IC is not an efficient strategy.

A deployment by IC would be further complicated because both the ADB and the NBS are fully integrated systems. This means that all of the individual administrative and scientific support functions performed by each are interdependent with other functions (property records are driven by procurements) and can, therefore, be affected by actions of another function. As an organization migrates from the ADB to the NBS, every function must be analyzed and adjusted to assure this interdependence.

- Both the ADB and the NBS would require modifications for each organizational deployment to the NBS. At a minimum, modifications would be needed to recognize whether a specific organization is being supported by the NBS or the ADB, and reporting would become enormously complicated. These modifications could seriously compromise the integrity of both software systems.
- In addition to the internal modification needed by each system, deploying by IC would require the building of multiple interfaces between the NBS and the ADB, e.g. to transfer the activity of an IC not yet migrated to the NBS General Ledger, or to combine the property acquisitions of IC's that have migrated to the NBS with the ADB property database that is servicing organizations that have not yet migrated to the NBS. These interfaces also would require continuous maintenance until full organizational deployment is achieved, changing with each new organizational deployment.
- Both the ADB and the NBS would have to provide the capability of sharing access to, or replicating, databases during the entire deployment process. Because of fundamentally different database structures (the ADB is hierarchical and the NBS is relational), it would be complicated to assure synchronization. Multiple data migration and conversions (to carry forward historical data) would also be required as each new entity is deployed.
- As an increasing number of organizations migrate to the NBS, the cost and time to design, develop, and maintain interface and data conversion software has the potential to equal or exceed the cost of implementing an ERP product. In effect, each organizational transition from the ADB to the NBS would require the development, testing, and implementation of conversion and interface software.

Therefore, it is proposed that NIH deploy the NBS by function. Each function will be deployed NIH-wide. This offers the best opportunity to reduce the risk of failure in an integrated environment and limits the interface and conversion requirements.

As displayed in Attachment 9, functional and technical teams will be simultaneously designing and testing their individual functions. By designing and testing functions simultaneously in a common location, with cross communication assured by the Project Management Team, the development of an integrated product will be facilitated. Deployment, however, will be sequential, beginning with the deployment of the General Ledger. Since all of the functions to be deployed in the NBS interface with the General Ledger, it is most efficient that it be deployed first. Deploying any other function first would require that NIH build temporary interfaces between each deployed function and

the central accounting system (CAS). In addition, the CAS might need modifications to its software so that it could accept transactions from NBS functions. Making the General Ledger available first simplifies the financial interfaces for all other functions and eliminates the need for temporary interfaces to legacy financial processes.

Travel and property are deployed after the General Ledger. This sequence is recommended as it is relatively quick and simple to implement these functions from a technical standpoint, and because it will provide a significant increase in service level in areas quite important to the scientific community. Similarly, the property module can be implemented easily as it essentially runs independently of the ADB once it accepts data on receiving. This will allow relatively quick deployment of a system that is central to reducing burden on the scientific community and to allowing NIH to carry out its fiduciary responsibilities.

Finally, the schedule calls for Acquisitions (inclusive of R&D Contracts), Accounts Payable, and Supply to be deployed along with the Service and Supply Fund activities. Because of the highly integrated nature of these functions, i.e., the relationship between the purchase of items and the payment for these items, it is recommended that Acquisitions, Accounts Payable, and Supply be deployed as a unit. With regard to Service and Supply Fund activities, this effort will most likely continue beyond the planned deployment cycle, because of the number and variety of these activities.

Scope and Complexity – The Implementation Plan assumes absolute adherence to the implementation principles that were established by the NBS Phase I Steering Committee. The schedule and the budget assume:

- *Limited Number of Interfaces* – Initial interfaces should only be built to connect the NBS with other NIH-wide enterprise systems. These include the ADB, IMPAC I and II, DHHS Payroll System, DHHS Payment Management System, Department of the Treasury Systems, the NIH Data Warehouse, DHHS EHRP, the NIH Status of Funds Database, and appropriate NIH Service and Supply Fund modules. In addition, an interface will be built to the Intramall, as appropriate, consistent with the e-procurement strategy developed by the NIH CIO. The NBS Steering Committee must approve any other interfaces after an analysis by the Project Team of the cost and schedule implications. It is expected, that should the Steering Committee approve such a change, adjustments in funding for development and maintenance, and accommodations to the NBS schedule will be provided.

- *No customizations* – As above, any limited exception should be made only after analysis of cost and schedule impact, and approval by the Steering Committee. The approval of any exception must be accompanied with adjustments to the budget and the schedule, as necessary.

Strict adherence to these principles should allow the NBS to mitigate the risks associated with "scope creep" and the cost and time variations inherent in implementing a program that becomes more complex than originally envisioned.

Technical Architecture and Support Requirements – Attachment 11 describes the existing architecture as well as the target architecture. Both the software that is being purchased from Oracle and other vendors, as well as the supporting hardware maintained by CIT, are described. It should be noted that additional, or "bolt on", software is being purchased from four additional vendors to satisfy NIH requirements that could not be achieved with the basic product from Oracle. In all four cases, consistent with the "lessons learned" above, this additional software is being purchased from business partners of Oracle. Each of these vendors, and the capability that their software will provide is described in detail in Attachment 11.

The support that will be required is provided in Attachment 12. Described in this attachment are the required technical infrastructure and applications support as well as the user support mechanisms that will be required by the implementation of this software. With regard to the latter, the plan for the Help Desk is outlined.

Conversion Plan – The Business Case makes various recommendations on steps that should be taken in developing a plan to convert data from the ADB and CAS to the NBS and these have been enumerated at the beginning of this section. The Conversion Plan addresses these issues and is provided as Attachment 13. This plan describes three major efforts: 1) the identification of all external system interfaces and those required to support the phased deployment of the NBS; 2) the conversion of data from the ADB and the CAS to the NBS; and 3) the testing process that will occur to assure a successful deployment and the subsequent decommissioning of the ADB.

As previously noted, the initial deployment of the NBS will focus on establishing interfaces between the NBS and other NIH enterprise systems. These were identified in the Business Case and are listed above under the heading Scope and Complexity. This initial section of the Conversion Plan also describes the process for data error correction. This process rests on the principle that, as they are discovered, data entry errors are to be corrected at their source and then the corrected data is transmitted to the NBS.

The next section of the Conversion Plan provides a description of the conversion of both static and dynamic data from the ADB and CAS to the NBS. Tables are provided that list the major types of data that will be converted and whether it will be converted manually or through an automated process. In most cases, while the types of data are known with certainty, the number of records that must be converted will not be known until the functional teams begin their detailed analysis.

The final section of the Conversion Plan describes the testing plans (note that the testing of interfaces is referenced earlier in Attachment 13 under A. Interfaces). Prior to the full deployment of any of the NBS functions, it will be necessary to satisfactorily accomplish acceptance testing to assure that the system is accurately

processing each transaction for that function. In addition, wherever possible, the new NBS implementation of a function should be tested against the ADB, as replication of ADB results will give more confidence. In either case, criteria that determine success or failure of a test must be established; these criteria will assure that all critical data are being transmitted accurately before the system is considered acceptable for deployment.

Security – A comprehensive outline of NIH's computer and application security is provided as Attachment 14. This plan details security program management and planning; access controls; application development and change control; segregation of duties; system software controls; and contingency planning.

Phase:

1. Prepare (Pre-Implementation)

4 months

2. Design, Develop, Test, Manage All Functions

Months 1 - 42

3. Deploy
   a. GL/Budgeting

Months 14- 20

   b. Travel

Months 21 - 31

   c. Property

Months 21 - 31

   d. Acquisition (including R&D Contracts)/AP/Supply

Months 32 - 42

   e. SSF

Months 30 and beyond

4. Measure/Evaluate/Support/ Enhance
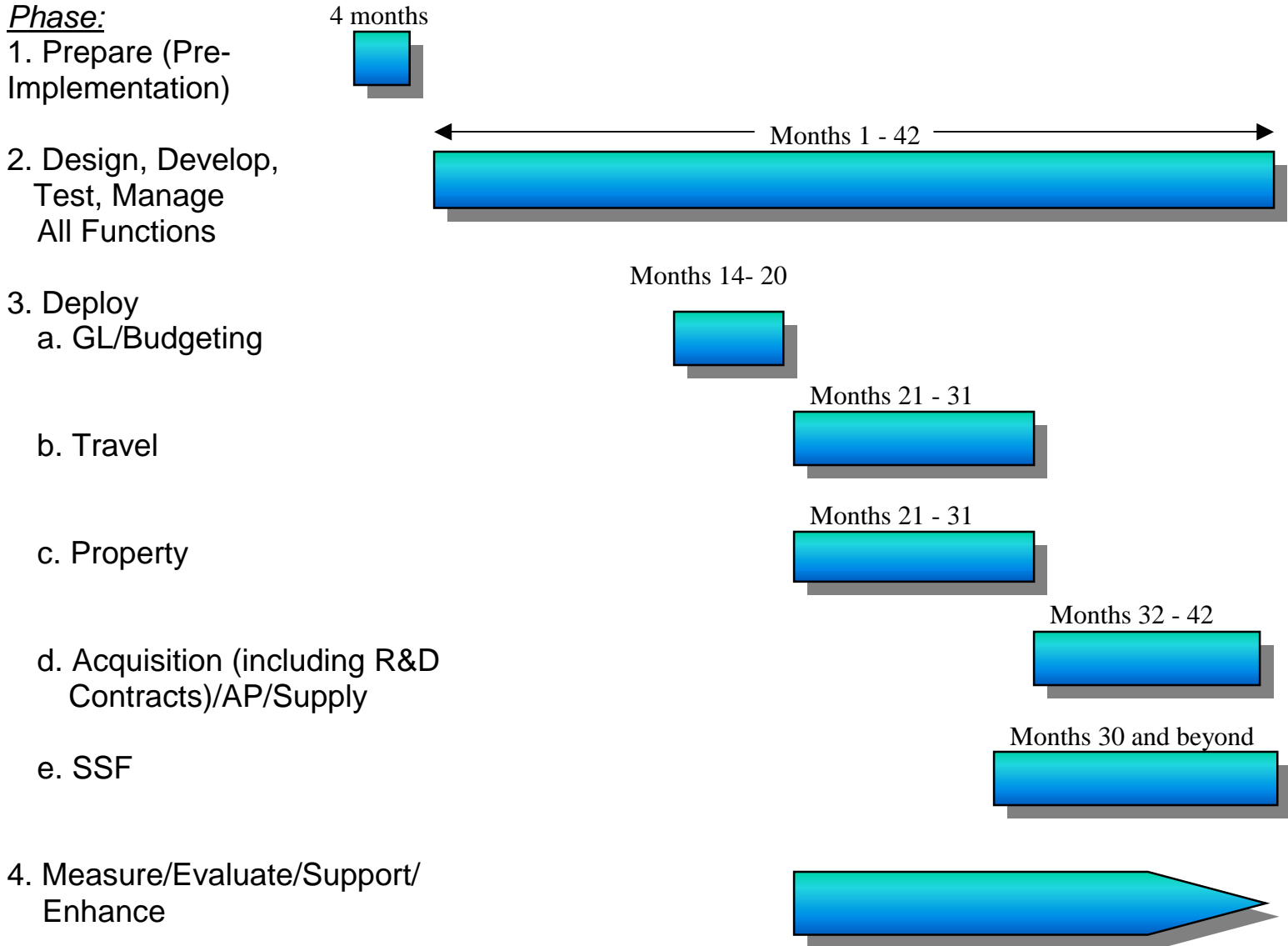
Introduction

The NIH Business System will be designed, developed and tested as a fully integrated facility that supports seven functional areas and interfaces with other major NIH and Departmental systems. Individual functions will be deployed on a phased basis over a 3½-year period. This plan presents an overview of the tasks that are included in the design, development, and testing of each function, and describes the proposed deployment strategy.

Develop and Test

Oracle software contains most of the needed functionality and the database will be configured to support this functionality. The tasks in Phase II are devoted to the following:

1) Development and approval of process scripts and organizational models.
2) Configuration of the purchased system to satisfy NIH business requirements.
3) Incorporation of overall and specific organizational preferences into the selected package's workflow.
4) Customization of the packaged software, but only as absolutely necessary and if approved by the NBS Steering Committee.
5) Unit and integrated test /adjustment of the NIH-tailored package to meet quality assurance requirements.
6) Identification and development of all NBS system interfaces including phased ADB interfaces during NBS implementation.
7) Phased deployment of NBS software.
8) Determination of "go-no-go" on any annual options for ERP software purchase.
9) Production support of the NBS.

The process for accomplishing each of these tasks is outlined below.

Design and Configuration of the Purchased System

- Functional specialists and NIH system integration staff complete necessary training.
- "Contractor, functional specialists and NIH system integration staffs", hereafter referred to as "team leads", will (1) determine how they will use the software for each function, (2) identify business rules to be applied, and (3) develop an overall functional design.
- PMT and team leads will identify those design changes that have policy implications for resolution by the Functional Advisory Committee and the NBS Steering Committee; the PMT and team leads will also regularly summarize progress to date and present it to the Advisory Committees and the Steering Committee.

- Team leads will identify those modifications that have change management implications and refer them to the PMT for action.
- Team leads will meet with the Functional Advisory Committee to present the functional design and to assure that all business rules are being accommodated (an iterative process).
- The Functional Advisory Committee will approve the design and business rules to be applied.
- When all functional design is complete, the PMT and team leads will finalize NBS design and review it with the appropriate functional community, the Steering Committee and other groups as appropriate.
- Team leads will configure each functional system and apply the business rules.
- Team leads will test each function to assure that the configuration is accurate and that business rules are being applied properly.
- Team leads will report test results to each functional team.

Workflow

- Team leads will develop a proposed workflow for each function and identify all interfaces with other functions.
- Team leads will meet with functional team members to discuss proposed workflow and to ensure that all other functional interfaces are identified (an iterative process).
- The team leads will refer any change to current workflow to the PMT to coordinate any necessary change management actions.
- The PMT will refer any workflow change that has policy implications to the Steering Committee for review.
- Each functional team will approve proposed workflow and interfaces with other functions.
- Team leads will apply workflow requirements.
- Team leads will test each function to determine that business rules and workflow operate as expected.
- Team leads will report the results of the application of workflow to the functional team.

Reports and Information Processing

- Each functional team will identify its standard requirements for on-line and batch reporting.
- Custom queries and reports will be defined and developed. Ad-hoc query requirements will be defined.

Data Conversion

Data will be converted from the ADB and CAS to the NBS as each NBS function is deployed. The process for developing data conversion procedures is outlined below.

- Identify existing ADB databases and segments of databases that will be moved from the ADB to tables in the NBS.
- Design procedures for converting the data identified from the ADB/CAS to the NBS.
- Develop the software for accomplishing each conversion.
- Test the conversion using test data.
- Test the conversion using live data.
- Verify the conversion results. Include an independent verification.

Customization

- Team leads will review the software package to determine that the only alternative to satisfying a high priority requirement is to develop a customized approach using the package's toolset.
- Team leads and PMT will refer any customization proposal to the appropriate Functional Advisory Committee which will provide a recommendation to the NBS Steering Committee after performing an assessment of its impact on the NBS's cost and schedule as well as its projected benefits.
- If approved by the Steering Committee, team leads will develop a proposed approach to satisfying the customization requirement.
- The proposed approach will be reviewed and approved (an iterative process) by the full functional team.
- Team leads will develop the customized software using the ERP tool-set.
- Results of the customization effort will be presented to the full functional team to assure that the customized software meets expectations.

Unit and Integrated Test

- Unit tests will be conducted on each software module to determine that business rules and related table functions are implemented as expected.
- In modules where software has been customized, unit testing will include evaluation of the accuracy of the customized function and a thorough review to assure that the customization has not affected other areas of the module.
- Team Leads will conduct integrated testing, i.e., the process of testing the marriage of the modules that comprise a particular function and the integration of those functions with other NBS functions.
- Results of the unit and integrated tests will be reviewed with the functional teams as appropriate to assure that expectations are being met and to keep them apprised of the development process.

System Interfaces
A. ADB Interfaces
It will be necessary to keep the ADB and the NBS processes synchronized throughout the NBS deployment process. As new processes are introduced in the NBS, ADB functions

will be decommissioned, but the integration among functions must be maintained. To accomplish this, all existing integration within the ADB will be maintained by interfaces between the NBS and the ADB. These interfaces must be in place before any new NBS functions can be implemented. The steps listed below will accomplish this.

- For each function to be deployed, the technical team will define all existing integration with remaining ADB function(s).
- The technical team will examine the NBS function to be deployed and design the proposed interfaces that will be developed to emulate the replaced ADB function.
- The technical team will review the proposed approach with the NBS Database Administrator and appropriate ADB staff.
- The technical team and ADB staff will develop the necessary software.
- The technical team and ADB staff will test the interfaces for accuracy.
- The technical team will prepare technical and relevant user documentation of the ADB interfaces.

B. Intramall

The Intramall is a NIH e-procurement system that is operational and is being enhanced under terms of an existing Cooperative Research and Development Agreement (CRADA). The NIH Chief Information Officer (CIO) is undertaking an evaluation of NIH e-procurement options and the development of an e-procurement strategy. Interfaces between the NBS and the Intramall will be defined in a manner that is consistent with the NIH e-procurement strategy.

C. Other Interfaces

Interfaces with external systems include the Payment Management System (PMS), DHHS Payroll, IMPAC II, EHRP, and the NIH Data Warehouse. These interfaces will be identified for each system using the steps listed below.

- The technical team will identify existing batch interfaces.
- The technical team will design error-handling procedures that will enable the transmission of errors to and the correction of errors by the "point of origin" system.
- The technical team will review the design of error handling procedures with appropriate functional teams. The design will be finalized.
- The technical team will develop application interfaces and error handling software.
- The technical team will test individual system interfaces to assure accuracy and acceptability by the point of origin system and financial management.
- When testing is complete, relevant technical and user documentation will be prepared.

Any additional interface recommendations will be presented to the appropriate Functional Advisory Committee along with a review of cost and schedule implications. The Functional Advisory Committee will make a recommendation to the Steering Committee, which will approve/disapprove the interface recommendation.

Phased Deployment of the NBS

In planning for deployment of the NBS, one alternative is to deploy by organization and the other is to deploy by NBS function.

An organizational deployment is particularly effective in vertically structured environments where there is little horizontal dependency among functions and organizational entities. When, for instance, an Institute, Center, or OD Office can operate as a relatively independent entity that has only occasional interaction with other functions and organizations, it makes sense to deploy systems on a smaller scale. The new system can be fully evaluated in a controlled environment that limits the impact on the larger organization. As a result, the organization as a whole deploys a better quality product that has undergone the rigors of full production testing.

However, if an organization is horizontally integrated as is NIH, and components such as the ICs and OD Offices use the same basic processes to carry out similar functions, a deployment by component becomes extremely complex and a functional deployment is preferred.

Some disadvantages of an organizational deployment in an organization that uses the same processes are as follows:

- The new system must build and support multiple interfaces to the old system that remain in place until full organizational deployment is achieved.
- To accommodate the individual organizations that are deploying the new system, the old system must be modified on an as-needed basis to recognize each organizational deployment effort and to build interfaces to them.
- Both the old and new systems must provide the capability of either sharing or copying databases during the entire deployment process.
- Multiple database conversions are required as each new entity is deployed.
- As the number of dependent organizations and functions grow, the cost and time to design, develop, and maintain interface and data conversion software has the potential to equal or exceed the cost of implementing an ERP product.

The complexity of an organizational deployment is also further complicated when horizontal organizations and functions are being converted from an integrated legacy system.

With regard to the NIH, Institutes, Centers, and OD Offices use the same basic systems to carry out administrative and scientific support functions, i.e., the same accounting, procurement, property, etc. systems. In addition, transactions flow in basically the same manner despite the fact that ICs may have idiosyncrasies. For example, although a requisition is created locally, it automatically creates a commitment in the accounting system when it is approved. The requisition is also automatically forwarded to a central purchasing function where a purchase order is created. This action in turn closes the prior

commitment and opens an obligation. When the purchased items are received locally, an accrual is established to expense the items and if any delivered item is considered accountable property, a preliminary property record is established in the central property system. Finally, when the invoice is received, it is matched against the purchase order and receiving information before a payment can be made. Each of these actions is organizationally and functionally dependent on the other.

Finally, NIH indeed does have a fully integrated legacy system (the ADB) that supports the existing NIH environment and could therefore expect further complications from an organizational deployment.

Therefore it is proposed that NIH deploy the NBS by function. Each function will be deployed NIH-wide. Typically, the deployment process involves several months for preparation, end-user training and acceptance testing, and another several months to actually deploy and optimize the new function. These are described below as pre-deployment and deployment.

A. Pre-Deployment
- In collaboration with change management staff of the PMT, the team leads will develop technical and user documentation for each function to be deployed.
- Representatives of the Human Resources Development Division (HRDD) or a similar organization will review the user documentation and participate in the initial user training.
- The systems integrator and the Change Management Team will work with the organization to develop training materials and procedures, and to conduct the initial training session(s).
- Following the initial training sessions, the organization will assume responsibility for user training related to each function to be deployed.
- In parallel with the training effort, the PMT and the team leads will develop acceptance test criteria.
- Acceptance test criteria will be presented to the full functional team for review and comment. Criteria will be modified where appropriate.
- The PMT and team leads will translate the acceptance test criteria into test scripts for the function to be deployed.
- Results to be expected from the testing of the scripts will be defined. As appropriate, these may include tracking of the evolution of data between specific processes of a function, the status of data that interface with the ADB, the expected results of interfaces with other NBS functions and external functions, and the anticipated General Ledger postings.
- An acceptance test team will include personnel who are experts in not only the function to be deployed, but also in any interface functions and upstream/downstream functions that may be affected by the function being deployed.
- The team leads and CIT technical support staff will collaborate to establish the test environment.

- If necessary, CIT will upgrade hardware to accommodate the new NBS function.
- Test scripts will initially be run in a batch simulation environment and reports will be generated at key points in the process. The reports will be used to compare the status of data flow against expected results at each key point. A final batch test will take a typical day's transactions and run them through the test environment.
- The next acceptance level will test the scripts in a simulated on-line production environment. The acceptance test team will enter data on-line and track it as it moves through other processes, interfaces, etc.
- All authorized users of the new function will be identified. User IDs, authorities, and initial passwords will be established. Users will be notified of their IDs and passwords. A secure facility will be in place that provides direct access to authorized personnel to obtain User IDs and passwords. Control of authorizing staff and passwords will be maintained centrally by a security function. This will allow an IC or OD official such as an Administrative Officer to obtain a user ID and initial passwords from a central source and to establish user authorities. Users will then be able to create personal passwords.
- Help desk personnel will be assigned to the new function or additional training will be provided to existing help desk staff.

B. Deployment
- The deployment team will convert all relevant data to the NBS and validate that the new databases are properly constituted.
- All authorized NIH users of each new function will receive access.
- Deployment will begin.
- The deployment team will monitor the effectiveness of the deployment, and will provide immediate response to problems and issues as they occur.
- Change control and implementation of fixes and enhancements will be undertaken.

Deployment Schedule

The phased deployment schedule proposes that NIH deploy the NBS beginning with Financial Management. The functional deployment sequence is proposed and justified below.

- General Ledger and Budget – All of the functions to be deployed in the NBS interface with the General Ledger. It is impractical to deploy other functions first. To do so would require that NIH build temporary interfaces between each deployed function and the central accounting system. In addition, the central accounting system could require modification in order to accept transactions from NBS functions. Making the General Ledger available first simplifies the financial interfaces for all other functions and eliminates the need for temporary interfaces to legacy financial processes.
- Travel – This function can be implemented using just one interface to the ADB. The financial interfaces will exist in the NBS General Ledger.

- Property – Accountable property items are automatically established during the receiving process. Following receiving, the property system runs independently from the rest of the ADB.
- Acquisition, Commercial Accounts and Supply – Because of the highly integrated nature of these functions, it is recommended that the last 11months of the deployment effort be spent on moving them as a unit.
- Service and Supply Fund – This effort will most likely continue beyond the planned deployment cycle, because of the number and variety of these activities.

This section discusses the current architecture and that proposed as the NBS solution, including major hardware and software components, peripheral devices, interfaces to other systems, data conversion, and other factors.

A. Existing Architecture

NIH currently uses its ADB to support much of the functionality planned for the NBS. The ADB is a COBOL-based system that uses the IMS database, a 3270 user interface and runs on an IBM mainframe.

The ADB provides online interactive transaction entry, edit, and routing, beginning at each relevant functional level and moving electronically through the review and approval process. Workflow is supported by a method that stores key data on the appropriate reviewing/approving official's queue for quick reference. When the reviewing/approving official logs onto the system, s/he may review the queue sequentially or directly access high priority records. When an action such as a purchase order is approved, the ADB automatically generates appropriate accounting transactions. For example, if a requisition exists for a purchase order, the obligating transaction contains a cross-reference to the prior commitment, which will cause a separate de-commitment transaction to be generated in the accounting process. Each evening, the ADB accounting transactions are sent to the NIH Central Accounting System (CAS) for batch processing.

ADB Security

IBM's Resource Access Control Facility (RACF) controls ADB security. Access to, and use of, individual ADB functions is controlled by security built into the ADB application software. A user file containing a password and authorities is maintained centrally for each user. An Institute or Center administrative officer establishes initial user identification, authorities and passwords. When a user logs in and provides the correct password, s/he is provided only those authorities listed on the user database. If a user loses or forgets her/his password, there is a controlled manual procedure for authorizing a new password by way of the user's administrative office.

Desktop Platforms

The ADB is designed around IMS, the 3278 terminal, and a entry screen that is character-based. Access is also available by way of Windows NT, Windows 95-2000, and Macintosh personal computers. Whatever the media, the user interface is always in 3278 format via terminal emulation.
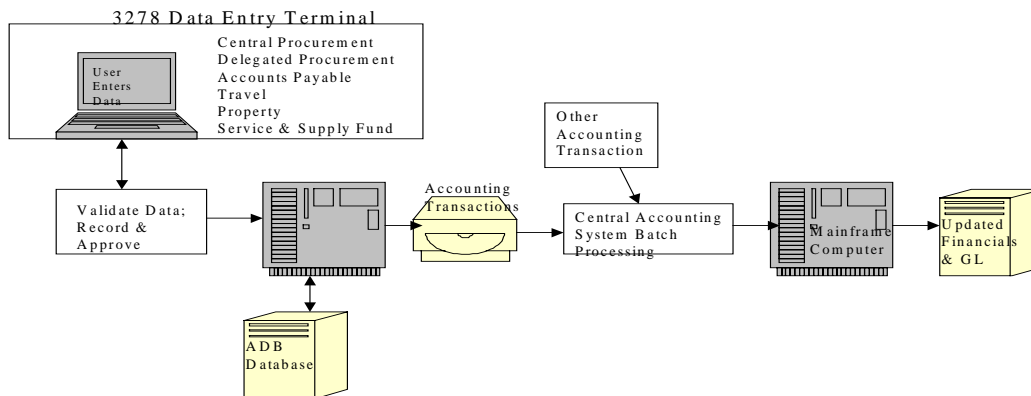
B. Target NBS Architecture

In the NBS architecture, additional functionality to that currently provided by the ADB will be added to support the following:

- R&D and other Contracts
- E-procurement
- Scheduled maintenance, warranty tracking and maintenance contract renewal processing for accountable property
- Bar-coding for inventory items
- Permanent change of station processing and electronic ticketing for travelers

All NBS functions will be fully integrated. This will eliminate the current process that creates batch transactions and forwards them to a central accounting function for processing each evening.

What is now an IMS hierarchical database will be converted to a relational database and the user interface will move from a 3278 character-based screen to a graphical interface, web-based format.

Oracle Enterprise Resource Planning (ERP) Software
NIH has purchased Oracle 11-i ERP software to address the following functions:
- Acquisition
- Property
- Service & Supply Fund Activities
- Supply

- Financial Management
- Research and Development Contracts
- Travel

In addition, four additional, or "bolt-on", software products will be used to improve some of the above functions and, in other cases, provide services that are not available from Oracle. These products are sold by Oracle business partners and Oracle will act as the single point of contact for enhancements and problem resolution between Oracle and these additional products.

"Bolt-on" Software Products

Datastream Systems, Inc. for Property Management – Datastream offers an application programming interface (API) to other systems that enables users to automatically generate work orders based on business rules. This software provides the functionality to meet the property tracking, maintenance, and disposal requirements. An interface between this software and the Oracle software already exists.

Compusearch Software Systems, Inc. for Federal Procurement and Contract Management – Compusearch Software Systems, Inc. provides Federal Acquisition Regulation (FAR) research and document assembly, open business rules that facilitate quick adaptation without customization costs, full reporting throughout the procurement process from requisition to closeout, and integration capability to the Oracle Federal Financials system. This software provides the functionality to meet the contracts management requirements. An interface between this software and the Oracle software already exists.

Gelco Information Network, Inc. for Travel Management – Gelco Information Network's Travel Manager software combines automated travel regulations, government forms generation, and electronic document processing into one software package. The system offers optional modules to automate ticket reservation and expense voucher processing. This software meets all travel requirements including sponsored travel, except instances in which there are multiple sponsors. An interface between this software and the Oracle software must be developed.

BPA Systems for Bar Coding Capabilities – BPA Systems provides supply chain automation for logistics, warehouse management and bar coding exclusively for Oracle applications. This software provides the bar code reading capabilities for the supply requirements. An interface between this software and the Oracle software already exists.

A Three-Tiered Architecture

NIH will implement the NBS in a three-tiered architecture, consisting of one or more database servers, one or more application/web servers and the client's workstations. Oracle's ERP product is built around a web server model in which the data is centralized and stored on a database server. The application logic resides on, and is executed from, an application server. The user interface and data presentation occur at the client desktop.

CIT currently provides Oracle database support on Compaq GS60 and GS140 AlphaServer platforms. As new application servers are required, CIT is currently providing Sun Enterprise 250s. CIT has or can obtain via just-in-time delivery the capacity needed for NBS to begin development in the current database infrastructure environment. Through continuous capacity planning and performance monitoring, CIT will ensure server capacity to meet NBS development, testing, and production requirements. CIT will assist NBS in performing stress testing to assure adequate user concurrency and system responsiveness.

NBS Technical Architecture

Personal Workstation

User
Enters
Data

R&D and Other Contracts
E-Procurement
Central Procurement
Delegated Procurement
Accounts Payable
Travel
Property
Service & Supply Fund

Application & Web Servers

Other
Accounting
Transactions

Remote
LAN

Validate & Process Data;
Update databases.

NBS
Database
Server
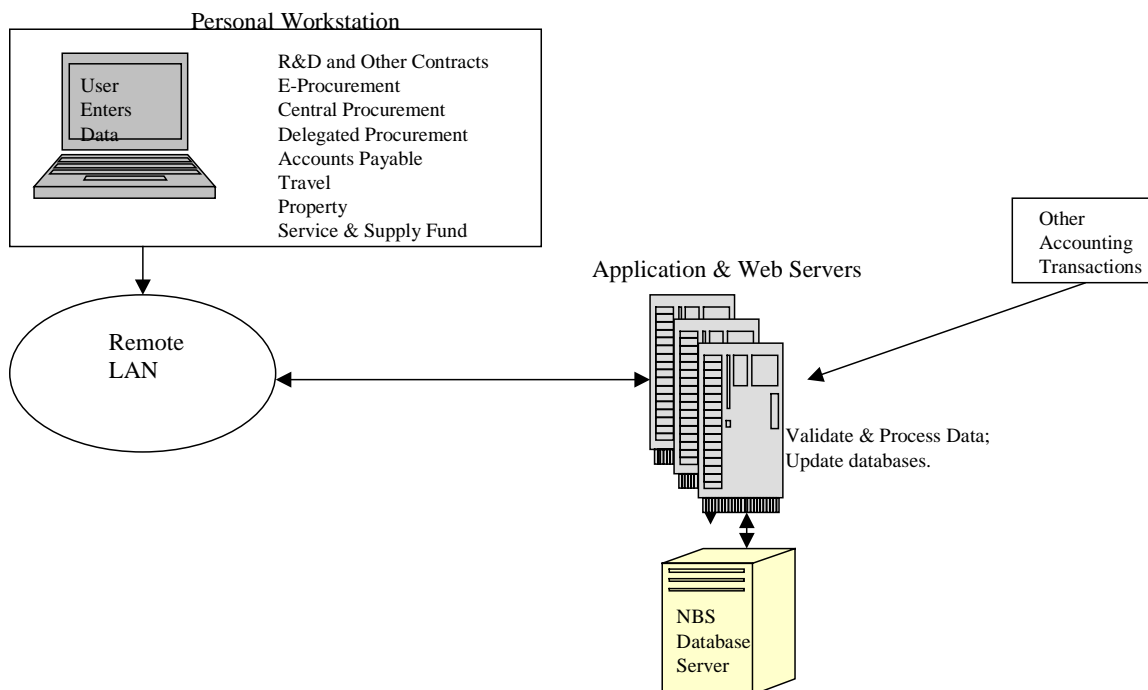
The NBS strategy for support will be centered on satisfying user needs in a proactive manner. This means establishing mechanisms that are either transparent to the user or easily accessible as direct support. Specific support requirements are detailed below.

A. <u>Infrastructure Support (Provided by CIT)</u>

Overall Management of the Databases
- Manage the physical database(s) and all instance creation/deletion.
- Manage database performance.
- Database tuning.
- Manage database availability, integrity, recoverability, backup and disaster recovery.
- Troubleshoot at the database level.
- Manage load balancing within the server.
- Manage database security including database user authentication and authorization.
- Manage growth of the database.
- Manage version control including potential effect on the application.
- Advise regarding application-induced performance issues.
- Conduct security administration.
- Undertake system audits.
- Conduct disaster recovery.

Network Monitoring and Maintenance
- Manage end-to-end connectivity for the NBS team (End-users will rely on IC technical staff for this function).
- Manage routers and wiring.
- Manage disaster recovery.
- Manage network capacity and performance issues.
- Manage change control, upgrades and expansions.
- Manage network-specific security including intruder detection and mitigation.
- Manage file server directory.

Other
- Manage operation and maintenance of the operating systems (NT and/or UNIX).
- Assure availability and performance of the web servers associated with the Oracle product.
- Assure the availability and performance of the computer(s) dedicated to running the Oracle applications.
- Manage the scheduling, monitoring, and maintaining batch procedures.
- Assure availability and performance of end-user workstations for the NBS team (End-users will rely on IC technical staff for this function).

B. Application Support (Provided by the NBS Project)

Overall Management of the NBS Application Databases
- Design, develop and maintain the NBS database(s).
- Assist with application upgrades and troubleshooting.
- Set up and execute database utilities and reporting tools.
- Set up and execute database audits.
- Assist in database and application tuning.
- Assist in backup and disaster recovery procedures.

Design, Configuration, Test, Deployment and Follow-on Support
- Perform application configurations.
- Maintain and modify configuration settings.
- Coordinate and apply application upgrades.
- Assist with data migrations.
- Understand and follow change control procedures.
- Assist in development of disaster recovery processes.
- Perform application troubleshooting.
- Assist in determining need for customization.
- As necessary, design and develop customized procedures.
- Define interface and conversion requirements.
- Adapt policies and procedures.
- Develop training materials.
- Provide post-implementation support.

Identify and Support Workflow Requirements
- Analyze business processes for workflow content.
- Advise on changes or improvements to workflow.
- Configure, test and maintain workflow tools.
- Assist in training users in workflow analysis and setup.

Provide Change Control
- Oversee all change control policies and procedures.
- Assure all components follow adequate issue resolution procedures.
- Adapt roles and responsibilities.

Software Version Control
- Coordinate and implement all changes, upgrades and corrections.
- Assure all components follow adequate backup and disaster recovery procedures.
- Track changes in related systems and manage adaptation to those changes.
- Manage multiple software versions and their entry into the production environment.

C. Help Desk (Shared Responsibility between CIT and the NBS Project)

The NBS will have a three-tiered Help Desk structure to provide core support.

Level 1 will be established through the Center for Information Technology help desk to resolve issues and problems that are not related to the NBS application. If issues or problems are application-related, they move to the NBS Competency Center, Level 2.

Level 2 will attempt to resolve the issue/problem over the phone, but may refer it to a technical or functional expert for review and resolution. If the issue or problem is not resolved at this level, it will move to the NBS Competency Center, Level 3.

Level 3 will process issues/problems in several ways. If there is a problem that can be replicated and involves a correction to the NBS application, it is referred to the functional/technical personnel to resolve the problem. If a problem is determined to relate to Oracle or one of the "bolt-on" vendors, it will be referred to Oracle for resolution. If the issue/problem is determined to require a significant application software modification, it will be documented and referred to the application support personnel for implementation. In the latter event, the modification will be processed within the NBS change control environment.

The NBS conversion plan consists of three major efforts. First is the identification of all external system interfaces and those interfaces that are required to support the phased deployment of ADB and NBS functions. Second is the conversion of static and dynamic data from the ADB to the NBS. And the third effort is the process that enables the deployment of each NBS function and the de-commissioning of its concomitant ADB function.

A. <u>Interfaces</u>

The initial deployment of the NBS will focus on establishing transaction interfaces between the NBS and other NIH enterprise systems: NIH Administrative Data Base (ADB), appropriate NIH Service and Supply Fund modules, IMPAC I and II, DHHS Payroll System, DHHS EHRP, DHHS Payment Management System, United States Department of the Treasury Systems, NIH Data Warehouse, and the NIH Status of Funds database. In addition, an interface will be built to the Intramall, as appropriate, consistent with the e-procurement strategy developed by the NIH CIO.

Prior to deploying each function, it will also be necessary to develop appropriate interfaces between the NBS and the ADB. These interfaces will assure that the production environment for both systems continues to provide support for all business functions in a manner that is transparent to the NIH user community.

Many interfaces allow data to co-exist in more than one database. Defining data ownership assures that updates to the data are coordinated and controlled by one source and that updates to other instances of the same data are synchronized with an update at the source. A carefully crafted manual/automated error correction mechanism will assure that data among systems is continuously synchronized.

Interface approaches and design will be coordinated extensively with the various functional teams and with external system representatives. Wherever possible, manual intervention in the interface processes will be minimized or eliminated. Once developed, each interface will undergo rigorous testing to assure that data integrity is maintained.

B. <u>Conversion of Static and Dynamic Data</u>

Based on the NBS function to be deployed, data that is stored in the ADB will be moved and reformatted to the NBS structure. As each NBS function is deployed, data will be converted from the ADB and CAS to the NBS. The process for developing data conversion procedures was outlined previously in this Section in Attachment 10.

Following verification and acceptance of conversion software, static data will be converted to the NBS. Static data typically exists in the form of reference tables used for validation purposes, e.g., an object class table. These tables change infrequently, so it is possible to move them into the NBS environment during the testing phase. Following acceptance test and prior to deployment, this data can be updated with the latest information.

Dynamic data are those data that undergo frequent change. These data can be partially converted to support the testing phase, but normally full conversion of dynamic data occurs when each NBS function is being prepared for final deployment. The picture below depicts the process and the charts that follow summarize current data conversion plans for the NBS.

Data Conversion Strategy – High Level Transaction Flow to NBS
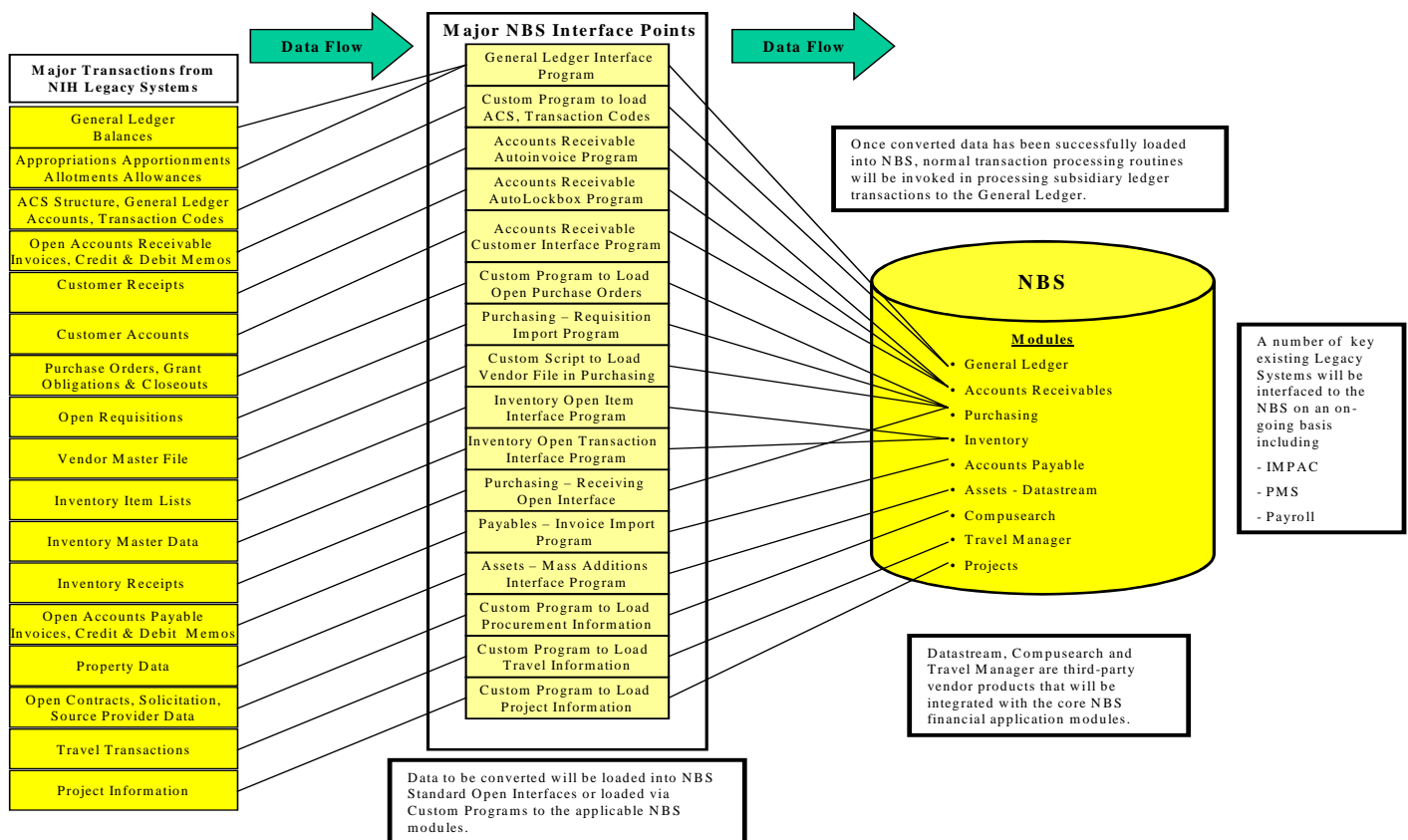
Table 1: Major types of data to be converted

Legacy System	Data Type	NBS Applications Module	NBS Interface	Number of Records	Conversion Mode	Comments
CAS – General Ledger	■ General Ledger Balances	■ General Ledger	■ General Ledger Interface	■ 45,000	■ Automated	■ NIH will convert year end G/L balances as opening balances for the new fiscal year. Analysis is needed to determine level of detail to store G/L. Crosswalks will then be developed to translate CAN structure to the new Accounting Flexfield.
CAS – General Ledger	■ General Ledger Transactions	■ General Ledger	■ N/A	■ TBD	■ No Conversion	■ Transaction history will not be converted to NBS. The NBS team should evaluate options for maintaining historical General Ledger transactions for reporting purposes (i.e., maintain legacy system or move to data warehouse).
CAS – General Ledger	■ Account Code Structure ■ GL Accounts ■ Transaction Codes	■ General Ledger	■ N/A	■ TBD	■ Manual	■ General Ledger reference data should be converted manually due to relatively low number of records. Crosswalks should be built to translate old to new account codes for comparison reporting.

Legacy System	Data Type	NBS Applications Module	NBS Interface	Number of Records	Conversion Mode	Comments
ADB – Funds Management	■ Appropriations ■ Apportionments ■ Allotments ■ Allowances	■ General Ledger	■ General Ledger Interface	■ TBD	■ Automated	■ Only open budgetary balances will be converted to NBS. Since conversion will be at year-end, fund balances not related to multi-year or no-year funds will be closed.
ADB – Travel	■ Closed Travel Documents (Authorizations, Advances and Vouchers) ■	■ Travel Manager	■ N/A	■ TBD	■ No Conversion	■ The NIH should close as many outstanding travel documents as possible prior to migration. This data may need to be maintained for reporting purposes.
ADB – Travel	■ Open Travel Authorizations ■ Open Travel Advances	■ Travel Manager	■ TBD	■ TBD	■ Manual	■ Open document balances should support their associated General Ledger balances (obligations and advances). All Travel Vouchers should be either prepaid or entered into the NBS following conversion.
ADB - Travel	■ Employees	■ Travel Manager	■ TBD	■ 20,000	■ Automated	■ Automated program will convert traveler profile for all NIH employees.
ADB - Travel	■ Travel Reference Data (e.g., Per Diem Data by Location, Preferred Vendor Data, etc.)	■ Travel Manager	■ TBD	■ TBD	■ Manual	

Legacy System	Data Type	NBS Applications Module	NBS Interface	Number of Records	Conversion Mode	Comments
ADB – Service and Supply Fund	■ Unbilled Receivables ■ Open Customer Invoices	■ Accounts Receivable	■ Auto Invoice	■ TBD	■ Manual	■ The NIH should close as many outstanding receivable documents as possible prior to migration. Open document balances should support their associated General Ledger balances.
	■ Collections	■ Accounts Receivable	■ N/A	■ TBD	■ No Conversion	■ Accounts Receivable balances will reflect all cash collections made prior to data migration. Detailed cash collection records will be maintained in legacy systems or moved to Data Warehouse.
	■ Customers	■ Accounts Receivable	■ Customer Interface	■ TBD	■ Automated	■ Automated program will convert customer records for all active NIH customers.
	■ Open Service & Supply Orders	■ Purchasing	■ TBD	■ TBD	■ Manual	■ Open document balances should support their associated General Ledger balances.
	■ Open Service & Supply Requisitions	■ Purchasing	■ TBD	■ TBD	■ Manual	■ Open document balances should support their associated General Ledger balances.

Legacy System	Data Type	NBS Applications Module	NBS Interface	Number of Records	Conversion Mode	Comments
	■ Open Inter/Intra Agency Agreements	■ Projects	■ TBD	■ TBD	■ Manual	■ Open document balances should support their associated General Ledger balances.
ADB - Inventory	■ Inventory Master Data	■ Inventory	■ Inventory Open Transaction Interface	■ TBD	■ Manual	
	■ Lot Control Data, Storage Location Control Data	■ Inventory	■ Open Item Interface	■ TBD	■ Automated	■ Automated program will convert all items currently held in inventory by the NIH.
	■ Planning and Replenishment Data	■ TBD	■ TBD	■ TBD	■ Manual	■ Reference data needed to specify NIH inventory control methods.
ADB – Acquisitions	■ Commitments – Open Requisitions	■ Purchasing	■ N/A	■ TBD	■ Manual	■ Open document balances should support their associated General Ledger balances.
	■ Obligations – Open Purchase Orders	■ Purchasing	■ N/A	■ TBD	■ Manual	■ Open document balances should support their associated General Ledger balances.
	■ Open Contracts	■ Compusearch	■ N/A	■ TBD	■ Manual	■ Open document balances should support their associated General Ledger balances.

Legacy System	Data Type	NBS Applications Module	NBS Interface	Number of Records	Conversion Mode	Comments
	■ Goods Receipts for Open Contracts and Purchase Orders	■ Purchasing	■ Receiving Open Interface	■ TBD	■ Manual	
	■ Open Solicitation Data	■ TBD	■ TBD	■ TBD	■ Manual	■ Convert data related to open solicitations at time of conversion.
	■ Source and Provider Data	■ TBD	■ TBD	■ TBD	■ Automated	■ Automated Program will convert all active NIH providers by major category.
ADB – Commercial Accounts	■ Vendor Master File	■ Purchasing	■ TBD	■ 15,000	■ Automated	■ Automated program will convert all NIH active vendors.
	■ Vendor Invoices	■ Payables	■ N/A	■ TBD	■ No Conversion	■ The NIH should pre-pay vendor invoices prior to conversion and enter new vendor invoices into NBS.
	■ Bank Information	■ Receivables	■ N/A	■ TBD	■ Manual	
	■ 1099 Information	■ Payables	■ TBD	■ TBD	■ Automated	■ Should be included as part of vendor conversion.
ADB – Property	■ Property Master Data ■ Physical Location Data ■ Depreciation Records	■ Fixed Assets/ ■ Datastream	■ Mass Additions Interface	■ TBD	■ Automated	■ Automated program will convert records for all assets currently held by NIH.

C. Deployment and De-Commissioning

The deployment stage of the Implementation Plan begins with the General Ledger and continues by phase until all ADB functions have been replaced within the NBS. To achieve full deployment of any function, it will be necessary to satisfactorily accomplish the following:

- Acceptance Test – Users who have been trained in the function to be deployed will test it using live data. Results of each data entry will be analyzed to assure that the system is accurately processing each transaction. When problems are discovered, the appropriate process(es) will be modified and retested. Following transaction testing, query and reporting procedures will be tested and analyzed for completeness and accuracy. Adjustments will be made as necessary.
- Parallel Test – Whenever possible, parallel testing of a function with its current ADB version will also occur. In cases where duplicate data entry is required to support a parallel test, the parallel test will be conducted as a more rigorous acceptance test. When duplicate data entry is not necessary, parallel testing will be used to assure a comprehensive evaluation and reasonable fallback opportunity. In both cases, the ADB will continue its processing until all results in the NBS have been evaluated. In either case, criteria that determine success or failure of a test must be established; these criteria will assure that all critical data are being transmitted accurately before the system is considered acceptable for deployment.
- Final Deployment and De-commissioning of the ADB – When all testing is complete and an independent validation and verification has been conducted, all required static and dynamic data will be either updated or re-converted and the associated ADB function will be de-commissioned.

NIH computer and application security covers six key areas and will be included in all NBS security planning. The key areas include (1) security program management and planning, (2) access controls, (3) application development and change control, (4) segregation of duties, (5) system software controls, and (6) contingency planning. Although some of these areas are included elsewhere in this document, they are summarized as relevant to the NBS security plan below.

A. <u>Security Program Management and Planning</u>

NIH has an organizational framework and a set of management procedures that are developed by the Institute and Center Information System Security Officers (ISSOs). These procedures provide guidance in identifying and assessing risks. The ISSOs decide what policies and controls are required, meet regularly to evaluate the effectiveness of existing policies and controls, and act to address any identified weaknesses.

To review NIH computer security and reference information, please access https://citinfo.cit.nih.gov/resources/sec_class/ref%26info1.htm.

B. <u>Access Controls</u>

At the higher level, access to NBS functions will be controlled by the NIH computer facility. At the lower level, the NBS application will detail each user's authority to access a specific function and the level at which access is granted.

External Controls
The NIH computer facility can provide physical protection for the entire NBS by installing a firewall. It also can provide software solutions that limit access to the overall NBS application. A firewall will be considered, but may not be required. However, to minimize the population that can invoke the NBS for eventual access, the computer facility will limit entry into the NBS application by way of encrypted user identification and passwords.

NBS Application Security
The NBS will maintain a table of authorized users and their individual authorities within the system. Once a user gains access to the NBS application, the application will determine whether a specific function may be made available to that user. Then, only the activities for which the user is authorized can be performed. For example, two users might have access to the purchasing function, one for display only and the other for update, display and approval. The authorized user table will be accessed to determine these limitations and each user's processing will be controlled at the appropriate level.

C. <u>Application Development and Change Control</u>

As described elsewhere, the responsible official for the NBS is the Deputy Director for Management, NIH (DDM). The DDM is advised by the NBS Steering Committee and the NBS Project Manager is responsible for the overall NBS implementation effort. At the project level the Project Management Team will coordinate the efforts of six NBS functional teams. The functional teams will comprise a minimum of two NIH functional team leads and system integration contractor personnel. Their technical counterparts are organized into a technical team. Each functional team will have available to them a resource team that represents a cross-section of the user community and is available to the functional team for advice and assistance with various tasks during all phases of the NBS development effort. A Functional Advisory Committee will also be available to each NBS functional team to provide review and approval of functional design and configuration. Each proposed solution will be reviewed and approved by the Functional Advisory Committee. The Functional Advisory Committee will also serve as an escalation point for major change and customization issues.

When a change or customization is proposed, the Project Management Team and team leads will work with functional staff to develop a design and to estimate relevant time, resources and cost benefits. The proposal will then be presented to the appropriate Functional Advisory Committee for review and recommendation, and then to the NBS Steering Committee for resolution. If the change/customization is approved, it will enter into the NBS change control process.

NBS change control must be coordinated in a manner that prevents the inadvertent introduction of software into the NBS test and production environments. During all stages of the NBS effort, all proposed NBS changes/customizations will be logged, tracked, controlled and managed centrally. An NBS change control coordinator will be responsible for the following:

- Coordinate and implement all changes, upgrades and corrections.
- Assure all components follow adequate backup and disaster recovery procedures.
- Track changes in related systems and manage adaptation to those changes.
- Manage multiple software versions and their entry into the production environment.

When the initial design stage of the NBS is completed, system configuration, simulation and validation will begin. During this stage, functional groups will be configuring the NBS to satisfy proposed designs and customized software may be developed; in a parallel mode, simulation and validation of results of these efforts will be ongoing.

As the NBS enters the functional deployment phase, users will be trained and acceptance testing will begin. This will include testing of the fully integrated NBS function, all proposed interfaces and related data conversion software. Finally, full deployment of the NBS will occur and system enhancements will be considered; problems will be encountered and require resolution; and development will continue for the broader NBS

that can affect multiple functions that are in several stages of development and/or production. Changes and enhancements will be prioritized and will follow the same change/customization controls outlined above.

D. Segregation of Duties

The Oracle ERP product is designed to enable an organizational workflow that ensures that one individual cannot control all key aspects of a business process. The NBS will use this design to identify different authorities for such things as purchasing, receiving and invoice processing. The NIH will establish levels of approval within appropriate key functions to provide reasonable organizational knowledge and control of key procedures.

NIH will document and communicate policies on individual and group responsibilities, and will assure that the NBS is designed to enforce these policies. The NBS will assure that effective physical and logical access controls are in place to support the NIH policies.

With regard to software, several levels of control will be created. Software and workflow procedures will be configured and tested in a controlled environment as conference room pilot (CRP) efforts during unit and integration testing. Teams of NIH staff representing multiple NBS functions will work together during each CRP session to assure that everything is working as expected. A change control coordinator will manage the software versions and the database administrator will manage and control database integrity. Controls will also be established to assure multiple levels of review prior to implementation of a new function or of a change to an existing NBS function.

E. System Software Controls

The NIH computer facility has implemented system software access and modification controls. System software access and modification controls for CIT's Enterprise Open System (Unix) application environment are provided through the coordinated efforts of three groups. First, the Unix system is maintained by system administrators who have established procedures for applying, testing, and implementing operating software changes. Second, system database maintenance and support is provided by CIT's Oracle system Database Administrators (DBAs). These individuals install, upgrade, and test Oracle system components and work with customers to diagnose and resolve database problems that may be related to the Oracle product or its configuration at CIT. The CIT Oracle system DBAs have full Oracle support (Silver Support) via an Oracle Point Of Contact purchased and maintained for this purpose. Finally, the Enterprise Open System security architecture is developed and maintained by a CIT security expert. This architecture includes general system protection as well as tailored access controls via application-specific firewalls.

The software access and modification controls described above have been developed with the guidance of an independent consultant, and have been audited to ensure compliance

with DHHS Level 3 security requirements for hosting critical agency applications and highly sensitive data.

F. Contingency Plan

The NBS contingency plan will be designed to assure that each ADB function remains in operation until rigorous unit, integration and acceptance testing of the related NBS function is completed. Many of the processes already discussed complement the contingency plan in a manner that enables the business of NIH to continue. This is accomplished at the same time that we assure that each new NBS facility not only is capable of replacing an ADB facility, but also provides appropriate additional functionality.

As noted in the final deployment and decommissioning discussion, every effort will be made to assure that each new NBS facility is functioning flawlessly before the comparable ADB function is terminated. However, in spite of these efforts, unexpected problems can occur. Several steps must be taken to assure that all NBS data is protected and that no data is lost. A contingency plan must ensure service continuity across the entire range of potential disruptions. These include relatively minor interruptions such as temporary power failures or accidental loss or erasure of NBS data as well as major disasters such as fires or natural disasters that may require reestablishing NBS operations at a remote location.

NBS Daily Operations
On-Line - The NBS will use Oracle data logging procedures to record all transactions that are processed and to take snapshots of NBS database tables at appropriate time intervals known as checkpoints. If errors occur and/or data is lost, the NBS function(s) affected will be terminated and the problem will be evaluated and corrected as soon as possible. Following correction and testing of the system to assure that it is functioning properly, the database will be reset to the most recent checkpoint preceding the problem and all transactions on the Oracle data log that follow that checkpoint will be reprocessed. This will reestablish the database tables to their status prior to the problem. Then, processing of the corrected function(s) will be initiated.

Batch - Copies of all database tables will be maintained along with the complete Oracle data logs on a five to six day (weekly) rotation basis. When nightly batch procedures result in the updating of on-line database tables, before and after versions of these tables will be maintained along with their related batch transactions. This will ensure that wherever errors are detected, full recovery at all levels is possible.

Disaster Recovery
Off-site Data and Software Storage - All current NBS software, database tables (five or six day rotation) and related Oracle data logs will be copied and stored at a local remote site. In the event of a disaster that destroys any of these copies on-site, they can be made available quickly to either the NIH computing facility or the currently contracted NIH remote computer facility.

Off-site Computing Facility - The central NIH computing facility has a comprehensive disaster recovery program that enables critical NIH systems to be quickly relocated to a remote site. On a regular basis, critical systems are tested at the remote site to assure that production procedures and related data tables can be quickly launched and that NBS processing can be reestablished. When the NBS begins deployment, arrangements will be made to move the production NBS to the remote site. At that time and at reasonable intervals thereafter, the NBS team will plan and conduct tests to assure that it is capable of supporting NBS users should a disaster occur.

V. CHANGE MANAGEMENT PLAN

A. *Risks and Lessons Learned*

- Implement effective change management – Implementing ERP is not so much a technical project as it is a change management project. Technical issues do not delay or disrupt most installations; change management issues delay or disrupt them.
- Establish a communication plan – This plan should identify target audiences, appropriate messages, activities and resources needed for effective communication over the project life cycle. Communications should focus on the fact that the NBS is not just a new technology system but also a business imperative for the NIH to keep pace with technological advances and to improve support services. Communication should also be used to set expectations and to explain that certain changes to existing ways of doing business must be made in order to realize other benefits of ERP. An effective communications plan incorporates multiple channels to manage expectations and to disseminate project progress.
- Establish a training plan – This plan should ensure that all appropriate personnel understand how processes will change after the NBS is implemented. The plan should define those to be trained, the training levels that are appropriate, and the requisite resources.
- Involve users in design and testing – Change will be hard but some potential issues can be avoided if users are involved in the design and testing.
- Manage expectations – It is important that the organization understand the capabilities of the system to be installed and the potential changes that may occur.

B. *Overview of the NBS Change Management Plan*

The NBS change management program has three principle objectives, consistent with the "lessons learned" above:
- To implement a comprehensive program of communication that includes both the communication of the strategic vision of the NBS and its administrative and scientific support objectives throughout the NIH, and information pertinent to specific communities, including the scientific community.
- To develop skills, knowledge, and abilities through a program of training for individuals participating in the NBS project and those who will use the NBS, and to facilitate the training and provision of other human resource services by NIH for employees whose positions may have been altered by the implementation of the NBS.
- To encourage new behaviors, including improved teamwork, innovation, and continuous learning.

The NBS project has focused considerable attention and resources on the change management component of this effort – both in its internal allocation of resources and in the laying of a framework, during this preparatory phase, for the implementation of a comprehensive program. With regard to resources, four of the ten positions allocated for the Project Management Team are targeted to change management activities. A senior manager, expert in human resources, will lead the change management function. This individual will supervise a communications specialist, a training specialist, and a change management generalist. While these individuals are members of the Project Management Team, they will work closely with the functional and technical teams as noted in the previous section on organization and staffing. They will serve as a resource for these teams, will regularly attend meetings of each of the Functional Advisory Committees, and will be full participants in weekly status meetings that the Project Manager will have with the functional team leads and the technical lead. This will allow the change management personnel to work closely with the teams and to be apprised of issues that may have change management implications as they arise.

In addition, a detailed Change Management Plan was developed prior to implementation to assure a comprehensive and focused program once implementation begins. This plan began with the identification of key "stakeholders", i.e., individuals or groups whose support and participation is key to the success of the implementation of the NBS. An analysis was then undertaken to identify the communication and training needs of each stakeholder during each phase of the implementation effort. The time required to implement this program of change management was then superimposed upon the detailed technical portion of the Implementation Plan to assure that sufficient time is allowed for the change management efforts. It was this integration of the change management effort with the detailed technical effort that led to the decision to extend the three-year planned implementation period projected in the NBS Business Case to a 3½ year plan.

The early development of a Change Management Plan is seen to be essential given the NIH commitment, endorsed by the Phase I NBS Steering Committee, to change business processes rather than to customize the software to fit existing business practices. In doing so, the Steering Committee endorsed approximately 120 "best practices" that are embedded in the purchased software, some of which will require changes to existing administrative or scientific support processes. While many of these "best practices" will involve only minimal change, others may be more significant. A few examples of practices endorsed by the Steering Committee and likely to have change management implications are as follows:

- Payment for goods and services would be authorized as follows:
  - For transactions[2] < $2,500 - payment would be authorized by the obligation of funds - neither receiving nor an invoice is required. Exceptions would be required for certain transactions, e.g., accountable

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[2] The term transaction is defined as the total value of the purchase order. If a procurement action is $10,000 and NIH received partial shipment for a portion of the order that is <$2,500, that partial shipment would require that receiving be entered by an appropriate official.

property. For such exceptions, the policy would be the same as that for transactions > $2,500.

➢ For transactions > $2,500 – payment would be made when an appropriate official enters receiving. No invoice is required.

- 3rd Party Logistics – Prime vendors would provide administrative supplies to the NIH and employees would receive their supplies directly rather than through the self-service stores.

- Minimized vendor base for procurements – Data would be available to assist in implementing a policy of single sourcing, where feasible, to avoid duplication of contracts, and the establishment of partnerships with primary vendors (when consistent with the Federal Acquisition Regulations).

- Real Time Tracking and Reporting of Job Costs – Customers will have the capability to monitor the progress of Service and Supply fund activities such as laboratory renovations to monitor progress and cost.

While the implementation of these best practices illustrates some of the more obvious instances for the need for an NIH-wide strategy to deal with the human resources consequences of change, there could be many others. Unfortunately, the exact nature of what will change will not be known with certainty until the functional working groups begin to examine the details of the work processes embedded in the software and map them against existing NIH business processes. While the software is extremely flexible, all who have experienced an ERP implementation caution that the largest challenges are not in managing the technical implementation, but in managing the change to processes and job content that inevitably occurs. Some may seem trivial, but are nonetheless real, such as a change in the computer screen formats that those who utilize the NBS must learn and become accustomed to. Others may be recognized as more profound as they may change workflow; may necessitate changes in approval authorities; may result in standardization of work processes within an IC, or across ICs; or may eliminate the need for a specific function or activity. In addition, issues will arise as a consequence of the greater availability of data such as who has access to specific data, the purposes for which that data will be used, etc., all of which will have change management consequences. This strategy of utilizing, to the maximum extent possible, the work process embedded in the software is consistent with the existing literature on ERP systems, as well as the experience of our University contacts, but it places a significant burden on the NIH to communicate potential change and to address the human resources issues that emerge as employees' jobs are altered.

The Change Management Plan is presented as Attachment 15. It identifies each of the proposed communication and training activities at each step in the implementation process for each of the 25 stakeholder groups identified by the Project Management Team. It should be noted that some of the status briefings to stakeholders such as the DDM, the NBS Steering Committee, and others in leadership positions may be devoted to alerting them to potential workflow and process changes and detailing the implications

that they may have for workforce planning. However, the pertinent workforce planning, per se, that is required will not be undertaken by the NBS Project Team but should be undertaken by the traditional NIH specialists in these matters.

The plan presents proposed training and communication activities for the 4 distinct phases of the implementation. The timeframes that are displayed in the plan extend through 22 months, i.e., the deployment of the General Ledger. Change management activities, similar to those undertaken during the deployment of the General Ledger, will be required during the deployment of the remaining functions. However, for presentation purposes, they have not been repeated in the display. Brief synopses of the activities that are included in each phase are provided below but the detailed attachments should be consulted to appreciate the magnitude of the effort that is contemplated:

- Preparation – This represents the period immediately following the approval of the Implementation Plan by the Steering Committee and the selection of individuals to participate in the project. The primary activities undertaken in this phase are briefings and other communications to the various stakeholders about the scope and impact of the project, and the training of work team members.
- Define NBS Processes – During this period, the work teams will be refining the NIH accounting structure and configuring the Oracle software to incorporate this structure. In addition, the work teams, in conjunction with the Functional Advisory Committees, will be defining the business processes for each of the various functions by considering existing business practices and potential improvements; applicable "best practices" endorsed by the Phase I NBS Steering Committee will be incorporated. In addition to communicating project status and plans, teams will begin to identify changes that may affect the workforce and require that NIH initiate workforce planning activities.
- Design, Test, and Build – Following approval of the business processes by Functional Advisory Committees and the NBS Steering Committee, the work teams will begin to configure the Oracle software to implement these processes. In addition, the work teams will begin to test the software in a controlled test environment. Communication initiatives as well as NIH workforce planning continue during this phase and the training of end-users begins.
- Deployment – During this phase, the work teams develop and conduct final acceptance tests; the decision to deploy the General Ledger is made by the NBS Steering Committee; and NIH begins (financial) operations using the Oracle software. Activities will focus on communications to coordinate the deployment, the training of end-users, and the continuation of transition planning by NIH through its completion.

Supplementing the Change Management Plan is an overview of the proposed training activities being considered for key participants in the NBS project. This overview is provided as Attachment 16.

Attachment 15 – Change Management Plan

Communication and Training Activities
PREPARATION

	Month 1	Month 2	Month 3

DDM
- Status/Guidance (PM) [Month 1]
- MTG DDM-1 re: Impl. Plan and Sponsor Role (Nov./Dec.)
- Status/Guidance (PM) | Status/Guidance (PM) [Month 2]
- MTG DDM-2 - Panel Discussion with DDM Only (a.m.)
- MTG SC-1 - Panel Disc. re: Setting Expectations
- Status/Guidance (PM) | Status/Guidance (PM) [Month 3]
- MTG DDM-3 – Potential Issues

Steering Cmte
- Status/Guidance [Month 1]
- MILESTONE: Project Kick-Off
- Status/Guidance (PM & PT Reps.)
- Status/Guidance (PM & PT Reps.)
- MTG SC-1 - Panel Disc. re: Setting Expectations
- Status/Guidance (PM & PT Reps.)
- Status/Guidance (PM & PT Reps.)

CIO
- MTG CIO-1 re: Impl. Plan and CIO Role (Nov./Dec.)
- Status/Guidance (S&PM)
- MTG CIO-2 re: IT Strategy (Nov)
- Status/Guidance (S&PM)
- Status/Guidance (S&PM)
- MTG SC-1 - Panel Disc. re: Setting Expectations
- Status/Guidance (S&PM)
- Status/Guidance (S&PM)

CIT
- Status (PMT Rep.)
- MTG CIT-1 re: Project Kick-Off Presentation
- Status (PMT Rep.)
- Status (PMT Rep.)
- MTG SC-1 - Panel Disc. re: Setting Expectations
- Status (PMT Rep.)
- Status (PMT Rep.)

Functional Advisory Cmte
- MTG FAC-1 re: Project Kick-Off
- Status/Guidance (Func. Leads)
- FAC-TRN-1 Overview Trng for FAC members
- Status/Guidance (Func. Leads)
- Status/Guidance (Func. Leads)
- MTG FAC-2 re: Work Plans Review

PMT
- PMT-TRN-3: Impl. Methodology
- PMT-TRN-4: Change Mgmt. Approach
- PMT-TRN-5: Workflow
- PMT-TRN-6: Overview of the Oracle Financial Apps
- MTG PMT-1 – Potential Issues
- PMT-TRN-7: DHHS - Performance Tracking

Core Team
- CORE-TRN-1: Project Overview
- CORE-TRN-3: Phase Training
- CORE-TRN-5-12: Module-Specific by Functional Teams
- CORE-TRN-2: Impl. Methodology
- CORE-TRN-4: Interface Development
- PMT-TRN-6: Overview of the Oracle Financial Apps

EOs
- Status (PM – Reg. EO Mtgs.)
- MTG EO-1 re: Project Kick-Off
- Status (PM)
- Status (PM)

Legend:
- ■ Meeting
- ▲ Milestone
- ◆ Work Session
- ◉ Road Show
- ▷ Status Meeting
- ● Email/Newsletter/Website Update
- ✛ Training

Communication and Training Activities
PREPARATION

	Month 1	Month 2	Month 3
IC Directors	■ MTG ICD-1 re: Project Kick-Off		▷ Status (PM)
Scientific Directors	■ MTG SD-1 re: Project Kick-Off		▷ Status (PM)
IC & OD Business Area Owners	▷ Status (FAC) ◎ RS IC/OD-1 re: Project Kick-Off	▷ Status (FAC)	▷ Status (FAC)
IC IT Support	■ MTG ICIT-1 re: Project Kick-Off	◆ Work Session ICIT-2 re: Resource Team Nominations	
Middle Managers	◎ RS MM-1 re: Project Kick-Off	● Status Update	● Status Update
Scientists & Other Customers	● Announcement & Newsletter	● Newsletter	● Newsletter
End Users	● Announcement & Newsletter	● Newsletter	● Newsletter
OPDIV CIOs	■ MTG OPDIV-1 re: Project Kick-Off		

Legend:
- ■ Meeting
- ▷ Status Meeting
- ▲ Milestone
- ● Email/Newsletter/Website Update
- ◆ Work Session
- ✚ Training
- ◎ Road Show

Communication and Training Activities
PREPARATION

	Month 1	Month 2	Month 3
Data Warehouse Group	Status (PMT Rep.)	Status (PMT Rep.)	Status (PMT Rep.)
Other Enterprise Systems	Status Update / Work Session OTHER-1 re: Identifying Intersecting Activities	Status Update	Status Update
Intramall	Status (CIO)	Status (CIO)	Status (CIO)
EEO Community	MTG EEO-1: NBS Project & EEO Implications (w/ EEO Director)	MTG EEO-2 re: Introduction to the NBS Project (for EEO Officers)	
Extramural Community	MTG EXTRA-1 re: Project Kick-Off		
Leg., Planning, Info./Public Affairs Communities	RS PA-1 re: Project Kick-Off	Status Update	Status Update
DHHS Financial			
AOs	Status (PM)	Status (PM)	Status (PM)
ITIRB			

Legend:
- ■ Meeting
- ▲ Milestone
- ◆ Work Session
- ◉ Road Show
- ▷ Status Meeting
- ● Email/Newsletter/ Website Update
- ✛ Training

Communication and Training Activities
DEFINE NBS PROCESSES

	Months 4 & 5	Months 6 & 7	Month 8	Month 9
DDM	Status/Guidance (Weekly w/ PM) ⇨⇨⇨ ■ MTG DDM-4 re: Future Process Kick-Off	Status/Guidance (Weekly w/ PM) ⇨⇨⇨ ■ MTG DDM-5 re: Interfaces & Customizations	Status/Guidance (Weekly w/ PM)	Status/ Guidance (Weekly w/ PM) ⇨⇨⇨
Steering Cmte	Status/Guidance (Bi-Weekly w/ PM & PT reps.) ⇨ Status/ Guidance ■ MTG SC-2 re: Future Process Kick-Off ■ MTG SC-3 re: Potential Issues	Status/Guidance (Bi-Weekly w/ PM & PT reps.) ⇨ Status/ Guidance ◆ Wrk Session SC-4 re: Workforce Planning MTG SC-5 re: Interfaces & Customizations	Status/Guidance (Bi-Weekly w/PM & PT reps.) ⇨ Status/ Guidance	Status/Guidance (Bi-Weekly w/ PM & PT reps.) ⇨ Status/ Guidance ▲ MILESTONE: Review Future Process Model
CIO	Status/Guidance (Bi-Weekly w/ S&PM) ⇨ Status/ Guidance (S&PM) ■ MTG CIO-3 re: Future Process Kick-Off	Status/Guidance (Bi-Weekly w/ S&PM) ⇨ Status/ Guidance ■ MTG CIO-4 re: Interfaces & Customizations	Status/Guidance (Bi-Weekly w/ S&PM) ⇨ Status/ Guidance (S&PM)	Status/Guidance (Bi-Weekly w/ S&PM) ⇨ Status/ Guidance (S&PM)
CIT	Status (Bi-Weekly w/ PMT Rep.) ⇨ Status ■ MTG CIT-2 re: Future Process Kick-Off	Status (Bi-Weekly w/ PMT Rep.) ⇨ Status ✛ CIT-TRN-1 Trng for Infrastructure Support Staff	Status (Bi-Weekly w/ PMT Rep.) ⇨ Status	Status (Bi-Weekly w/ PMT Rep.) ⇨ Status
Functional Advisory Cmte	Status/Guidance (Bi-Weekly w/ Func. Leads) ⇨ Status/ Guidance ■ MTG FAC-3 re: Future Process Kick-Off ◆ Work Sessions FAC-4 re: Script Review	Status/Guidance (Bi-Weekly w/ Func. Leads) ⇨ Status/ Guidance ■ MTG FAC-4 re: Interfaces & Customizations	Status/Guidance (Bi-Weekly w/ Func. Leads) ⇨ Status/ Guidance	Status/Guidance (Bi-Weekly w/ Func. Leads) ⇨ Status/ Guidance ■ MTG FAC-5 re: Recommend Future Process Model
PMT		◆ Work Sessions PMT-2-x re: Workforce Planning		
Core Team	✛ CORE-TRN-13: Phase Training		✛ CORE-TRN-14: Financial Reporting – FM Team	
EOs	⇨ Status (PM – Reg. EO Mtgs.) ⇨ Status (PM)	⇨ Status (PM) ⇨ Status (PM) ◆ Wrk Session EO-2-x re: Workforce Planning	⇨ Status (PM)	⇨ Status (PM)

Legend:
- ■ Meeting
- ⇨ Status Meeting
- ▲ Milestone
- ● Email/Newsletter/ Website Update
- ◆ Work Session
- ✛ Training
- ⊙ Road Show

Communication and Training Activities
DEFINE NBS PROCESSES

	Months 4 & 5	Months 6 & 7	Month 8	Month 9
IC Directors		Status (PM)		Status (PM)
Scientific Directors		Status (PM)		Status (PM)
IC & OD Business Area Owners	Status (FAC) Status (FAC)	Status (FAC) Status (FAC) ◆ Work Sessions IC/OD-2 re: Workforce Planning	Status (FAC) ✚ IC/OD-TRN-1: Oracle Overview Training	Status (FAC)
IC IT Support	Status (Tech. Lead)	✚ ICIT-TRN-1: Oracle Overview Training	Status (Tech. Lead)	
Middle Managers	● Status Update ● Status Update ◉ RS MM-2 re: Future Process Kick-Off	● Status Update ● Status Update	● Status Update	● Status Update
Scientists & Other Customers	● Newsletter ● Newsletter ◉ RS SCIENT-1 re: Intro. to the NBS Project	● Newsletter ● Newsletter	● Newsletter	● Newsletter
End Users	● Newsletter ● Newsletter ◉ RS EU-1 re: Intro. to the NBS Project	● Newsletter ● Newsletter	● Newsletter	● Newsletter
OPDIV CIOs	■ MTG OPDIV-2 re: Future Process Discussion			

Legend:
■ Meeting ▲ Milestone ● Email/Newsletter/Website Update ◆ Work Session ◉ Road Show ✚ Training ⊳ Status Meeting

Communication and Training Activities
DEFINE NBS PROCESSES

	Months 4 & 5		Months 6 & 7		Month 8		Month 9	
Data Warehouse Group	Status (PMT Rep.)	Status	Status (PMT Rep.)	Status	Status (PMT Rep.)	Status	Status (PMT Rep.)	Status
			◆ Work Session DW-1 re: NBS Design & Interface Issues					
Other Enterprise Systems	● Status Update	● Status Update	● Status Update	● Status Update		● Status Update		● Status Update
			◆ Work Session OTHER-2 re: NBS Design & Interface Issues					
Intramall	Status (CIO)	Status (CIO)	Status (CIO)	Status (CIO)	Status (CIO)		Status (CIO)	
EEO Community	Status (PM)	Status (PM)	Status (PM)	Status (PM)	Status (PM)		Status (PM)	
			◆ Work Session EEO-3 re: Transition Planning					
Extramural Community	Status (Steering Cmte. Reps.)				Status (Steering Cmte. Reps.)			
Leg., Planning, Info./Public Affairs Communities	● Status Update	● Status Update	● Status Update	● Status Update		● Status Update		● Status Update
	◉ RS PA-2 re: Future Process Kick-Off							
DHHS Financial			Status (Sponsor Rep.)					
AOs	Status (PM)	Status (PM)	Status (PM)	Status (PM)		Status (PM)		Status (PM)
ITIRB			Status (Every 6 mos. w/ PM)					

Legend:

■ Meeting	▲ Milestone	● Email/Newsletter/ Website Update	◆ Work Session	◉ Road Show
▷ Status Meeting			✛ Training	

Communication and Training Activities
DESIGN, TEST & BUILD

	Months 10, 11 & 12	Months 13, 14 & 15	Months 16 & 17
DDM	Status/ Guidance (Weekly w/ PM) — MTG DDM-6 re: CRPI Phase Kick-Off	Status/ Guidance (PM)	Status/ Guidance (PM) — Meeting DDM-7 re: Contingency Planning — MTG DDM-8 re: Approve CRPI & Transition Plan
Steering Cmte	Status/ Guidance (Bi-Weekly w/ PM & PT reps.) — MTG SC-6 re: CRPI Phase Kick-Off	Status/ Guidance (PM & PT reps.) — MTG SC-7 re: Customization Details	Status/ Guidance (PM & PT reps.) — Meeting SC-8 re: Contingency Planning — MILESTONE: Review CRPI & Transition Plan
CIO	Status/ Guidance (Weekly w/ S&PM) — MTG CIO-5 re: CRPI Phase Kick-Off	Status/ Guidance (S&PM) — Meeting CIO-6 re: Design Issues/Customizations	Status/ Guidance (S&PM) — Meeting CIO-7 re: Contingency Planning
CIT	Status (Weekly w/ PMT Rep.) — Meeting CIT-3 re: CRPI Phase Kick-Off	Status (PMT Rep.) — Meeting CIT-4 re: Design Issues/Customizations — Meeting CIT-5 re: Contingency Planning	Status (PMT Rep.) — CIT-TRN-2 Trng for help desk staff
Functional Advisory Cmte	Status/ Guidance (Func. Leads) — Status/Update (FAC Chairs w/ PM – Bi-weekly) — MTG FAC-7 re: CRPI Kick-Off	Status/ Guidance (Func. Leads) — Status/Update (FAC Chairs w/ PM – Bi-weekly) — Work Sessions FAC-8 re: Customization Details	Status/ Guidance (Func. Leads) — Status/Update (FAC Chairs w/ PM – Bi-weekly) — MTG FAC-9 re: Recommend CRPI & Transition Plan
PMT			
Core Team	CORE-TRN-15: Phase Training — CORE-TRN-16: Reporting		
EOs	Status (PM – Reg. EO Mtgs.) — Status (PM) — Status (PM)	Status (PM) — Status (PM) — Status (PM)	Status (PM) — Status (PM)

Legend: ■ Meeting — ▷ Status Meeting — ▲ Milestone — ● Email/Newsletter/ Website Update — ◆ Work Session — ✛ Training — ◉ Road Show

Communication and Training Activities
DESIGN, TEST & BUILD

	Months 10, 11 & 12			Months 13, 14 & 15			Months 16 & 17	
IC Directors		Status (PM)			Status (PM)			
Scientific Directors		Status (PM)			Status (PM)			
IC & OD Business Area Owners	Status (FAC)	Status (FAC)	Status (FAC)	Status (FAC)	Status (FAC)	Status (FAC)	Status (FAC)	Status (FAC)
IC IT Support	Status (Tech. Lead)	Status (Tech. Lead)	Status (Tech. Lead)	Status (Tech. Lead)	Status (Tech. Lead)	Status / ICIT-TRN-2: System Demos	Status (Tech. Lead) / ICIT-TRN-3: Connectivity & Troubleshooting Trng.	Status (Tech. Lead)
Middle Managers	Status Update	Status Update	Status Update / RS MM-3 re: CRPI Kick-Off	Status Update	Status Update	Status Update	Status Update	Status Update
Scientists & Other Customers	Newsletter	Newsletter	Newsletter / RS SCIENT-2 re: Review NBS Design	Newsletter	Newsletter	Newsletter / SCIENT-TRN-1: Provide System Demos	Newsletter / SCIENT-TRN-2: Pilot test training	Newsletter / SCIENT-TRN-3: "Light User" NBS & Process Training
End Users	Newsletter	Newsletter	Newsletter / RS EU-2 re: Review NBS Design	Newsletter	Newsletter	Newsletter / EU-TRN-1: Provide System Demos	Newsletter / EU-TRN-2: Pilot test training	Newsletter / EU-TRN-3: NBS & Process Training
OPDIV CIOs		MTG OPDIV-3 re: NBS Design & Testing						

Legend:
- ■ Meeting
- ▲ Milestone
- ● Email/Newsletter/Website Update
- ◆ Work Session
- ✛ Training
- ◉ Road Show
- ⬡ Status Meeting

Communication and Training Activities
DESIGN, TEST & BUILD

	Months 10, 11 & 12	Months 13, 14 & 15	Months 16 & 17
Data Warehouse Group	Status (PMT Rep.) Status (PMT Rep.) Status (PMT Rep.)	Status (PMT Rep.) Status (PMT Rep.) Status (PMT Rep.) Work Sesion DW-2: NBS Design & Testing	Status (PMT Rep.) Status (PMT Rep.)
Other Enterprise Systems	Status Update Status Update Status Update	Status Update Status Update Status Update Work Sesion OTHER-3: NBS Design & Testing	Status Update Status Update
Intramall	Status (Monthly w/ CIO) Status (CIO) Status (CIO)	Status (CIO) Status (CIO) Status (CIO)	Status (CIO) Status (CIO)
EEO Community	Status (Monthly w/ PM) Status (PM) Status (PM) Working Session EEO-4: Continue Transition Planning	Status (PM) Status (PM) Status (PM) Working Session EEO-5 re: Finalize Transition Plan	Status (PM) Status (PM)
Extramural Community	Status (Steering Cmte. Reps.)	Status (Steering Cmte. Reps.)	Status (Steering Cmte. Reps.)
Leg., Planning, Info./Public Affairs Communities	Status Update Status Update Status Update RS PA-3 re: CRPI Kick-Off	Status Update Status Update Status Update	Status Update Status Update
DHHS Financial	Status (Sponsor Rep.)		
AOs	Status (Monthly w/ PM) Status (PM) Status (PM)	Status (PM) Status (PM) Status (PM)	Status (PM) Status (PM)
ITIRB	Status (Every 6 mos. w/ PM)		

Legend:
- ■ Meeting
- ▲ Milestone
- ◆ Work Session
- ◉ Road Show
- ⬠ Status Meeting
- ● Email/Newsletter/Website Update
- ✛ Training

NIH Business System

Communication and Training Activities
DEPLOYMENT

	Months 18 & 19	Months 20 & 21	Month 22
DDM	Status/ Guidance (Weekly w/ PM) — MTG DDM-9 re: Deployment Kick-Off	Status/ Guidance (Weekly w/ PM) — MTG DDM-10 re: Deployment Readiness Review	Status/ Guidance (PM) — MTG DDM-11 re: Go Live Preparation
Steering Cmte	Status/ Guidance (Weekly w/ PM & PT reps.) — MTG SC-9 re: Deployment Kick-Off	Status/ Guidance (Weekly w/ PM & PT reps.) — MILESTONE: - Review Acceptance Testing	Status/ Guidance (PM & PT reps.) — MILESTONE: - Make "Go Live" Decision
CIO	Status/Guidance (Weekly w/ S&PM) — MTG CIO-8 re: Deployment Kick-Off	Status/Guidance (Weekly w/ S&PM) — MTG CIO-9 re: Deployment Readiness Review	Status/ Guidance (S&PM) — MTG CIO-10 re: Go Live Preparation
CIT	Status (Weekly w/ PMT Rep.) — Meeting CIT-6 re: Deployment Kick-Off	Status (Weekly w/ PMT Rep.) — MTG CIT-7 re: Cut-Over Procedures — MTG CIT-8 re: Deployment Readiness Review	Status (PMT Rep.) — MTG CIT-9 re: Go Live Preparation
Functional Advisory Cmte	Status (Weekly w/ Func. Leads) — MTG FAC-10 re: Deployment Kick-Off	Status (Weekly w/ Func. Leads) — MTG FAC-11 re: Cut-Over Procedures — MTG FAC-12 re: Deployment Readiness Review	Status (Func. Leads) — MTG FAC-13 re: Go Live Preparation
PMT			
Core Team	CORE-TRN-17: Phase Training	CORE-TRN-18: Phase Training ("Go Live")	
EOs	Status (PM – Bi-Weekly at EO Mtgs.) — MTG EO-3 re: Deployment Kick-Off	Status (PM – Bi-Weekly at EO Mtgs.)	Status (PM – Bi-Weekly at EO Mtgs.) — MTG EO-4 re: Go Live Preparation

Legend:
- Meeting
- Status Meeting
- Milestone
- Email/Newsletter/ Website Update
- Work Session
- Training
- Road Show

Communication and Training Activities
DEPLOYMENT

	Months 18 & 19	Months 20 & 21	Month 22
IC Directors	Status (PM) MTG ICD-2 re: Deployment Kick-Off	Status (PM)	Status (PM) MTG ICD-3 re: Go Live Preparation
Scientific Directors	Status (PM) MTG SD-2 re: Deployment Kick-Off	Status (PM)	Status (PM) MTG SD-3 re: Go Live Preparation
IC & OD Business Area Owners	Status · Status (FAC) MTG IC/OD-3 re: Deployment Kick-Off	Status · Status MTG IC/OD-4 re: Deployment Readiness Review	Status · Status · Status · Status (FAC) MTG IC/OD-5 re: Go Live Preparation MTG IC/OD-6 re: Post Go-Live
IC IT Support	Status/Guidance (Weekly w/ Tech. Lead)	Status/Guidance (Weekly w/ Tech. Lead) MTG ICIT-2 re: Cut-Over Procedures	Status/ Guidance (Tech. Lead)
Middle Managers	Status Update (Weekly) RS MM-4 re: Deployment Kick-Off	Status Update (Weekly)	Status Update · Status Update · Status Update · Status Update RS MM-5 re: Post Go-Live
Scientists & Other Customers	Newsletter · Newsletter RS SCIENT-3 re: Deployment Kick-Off	Newsletter · Newsletter RS SCIENT-4 re: Deployment Readiness Review	Newsletter RS SCIENT-5 re: Post Go-Live
End Users	Newsletter · Newsletter Work Sessions EU-3x re: Acceptance Testing	Newsletter · Newsletter RS EU-4 re: Deployment Readiness Review	Newsletter RS EU-5 re: Post Go-Live
OPDIV CIOs	MTG OPDIV-4 re: Deployment Strategy		MTG OPDIV-5 re: Post Go-Live

Legend: ■ Meeting · ▷ Status Meeting · ▲ Milestone · ● Email/Newsletter/Website Update · ◆ Work Session · ✛ Training · ◉ Road Show

Communication and Training Activities
DEPLOYMENT

	Months 18 & 19	Months 20 & 21	Month 22

Data Warehouse Group
- Status (Weekly w/ PMT Rep.)
- Work Session DW-3 re: Deployment Kick-Off
- Status
- Work Session DW-4 re: Cut-Over Procedures
- Status
- Work Session DW-5 re: Shift for Go Live
- MTG DW-6 re: Post Go Live

Other Enterprise Systems
- Status Update (Weekly)
- Work Session OTHER-4 re: Deployment Kick-Off
- Status Update (Weekly)
- Work Session OTHER-5 re: Cut-Over Procedures
- Status Update (Weekly)
- MTG OTHER-6 re: Post Go Live

Intramall
- Status (Weekly w/ CIO & PMT Rep.)
- Status
- Status

EEO Community
- Status (PM)
- Status (PM)
- MTG EEO-6 re: Transition Planning Follow-Up
- Status (PM)
- Status (PM)
- MTG EEO-7 re: Transition Planning Progress
- Status (PM)

Extramural Community
- Status (Steering Cmte. Reps.)
- EXTRA-TRN-1: Reporting & Overview Training
- MTG EXTRA-2 re: Deployment Readiness Review
- Status (Steering Cmte. Reps.)

Leg., Planning, Info./Public Affairs Communities
- Status Update (Weekly)
- RS PA-4 re: Deployment Kick-Off
- Status Update (Weekly)
- Status Update (Weekly)
- RS PA-5 re: Post Go-Live

DHHS Financial
- Status (Sponsor Rep.)
- Status (Sponsor Rep.)

AOs
- Status (PM)
- Status (PM)
- Status (PM)
- Status (PM)
- Status (PM)

ITIRB
- Status (Every 6 mos. w/ PM)

Legend:
- ■ Meeting
- ▲ Milestone
- ◆ Work Session
- ◉ Road Show
- ⬭ Status Meeting
- ● Email/Newsletter/ Website Update
- ✚ Training

The Change Management members of the PMT, assisted by the systems integration contractor, and in conjunction with the Human Resources Development Division (HRDD) or another central training mechanism, will determine overall education and training needs. This includes the development of a training program and related materials for the Steering and Advisory Committee members, members of the Project Teams, and NIH users of the NBS.

Obviously, different types of training must be developed for each of these different groups. A detailed Education and Training Plan will specifically name trainees, courses, locations, etc. However, at the present time, four types of training are contemplated:

- Overview
- Function-Specific
- Informal
- End-user

Overview Training
Audience: Overview training can be provided at any level within the NIH on an as-needed basis. It will be provided if there is a perceived need to clarify or receive an orientation on application features and functions, technical topics, specific implementation techniques or business practices. The Core Project Team will be required to take this training. Sessions will be offered to the NBS Steering Committee, Functional Advisory Committees and Resource Teams. Preparation and presentation of overview training is custom in nature and will often require support from several sources. The duration of overview training should be no longer than one day for any single topic.

Content: The training will enable attendees to understand the functions that the ERP will provide, become familiar with the computer screens and displays, and identify differences between the new and current systems.

Function Specific Training
Audience: Function specific training will be provided to all core team functional leads and will be held at an Oracle Education Center. Either Oracle Education instructors or Oracle application consultants will deliver product training for Oracle Applications. The technical team will attend technical training for database administration, tools and system administration.

Content: This training will provide sufficient depth to enable the attendees to configure the system with the assistance of the system integrator.

Informal Training
Audience: The Functional Resource Teams and Advisory Committees will be offered overview training and will receive regular briefings to review process changes and the

configuration for each function. The system integrator and functional team leads will conduct these briefings, at a minimum, on a weekly basis during the first four months and possibly less frequently thereafter.

Content: Early briefings will concentrate on the capabilities of the Oracle ERP product, design of the NBS, processes and workflow within the NBS design. The resource teams and advisory committees will also be offered the opportunity for some hands-on experience during conference room pilot testing, i.e., testing of the software in a controlled environment, and their advice will be solicited.

End-user Training
Audience: End-user training will be provided to all system users who have responsibilities directly related to one or more functions of the NBS and for personnel, including scientists, that will use the new system on a casual basis.

Content: The PMT's change management specialists, the system integrator and functional team leads, in conjunction with the HRDD and the user community, will jointly determine the best medium for training different employees during the NBS design and development phase. Classroom training may be best for intense users of the NBS. The most likely training approach for intense end-users at the NIH is to include the software end-user training into the overall functional training courses provided by the Human Resources Development Division (HRDD) or some other central mechanism. End-user training will be conducted immediately before the acceptance test date for each NBS application. End-users will be granted access to the production systems upon completion of the following training:

- Logging on/off system.
- System navigation.
- Job-specific applications.
- Changes in policies and procedure.
- Overview of key functional processes related to each specific job function.

A different approach may be best for users who do not require a detailed knowledge of the operations of the NBS. For example, in the Phase I deliberations of the Scientist Focus Group, it was noted that some scientific personnel may require more intense training while others may require some training but at a lower level of intensity. While the duration for end-user training is estimated to be approximately one to two days per specific function, every attempt will be made to consider the limited time that scientists may have available for such training. The distribution of an instructional CD, or web-based training might be an option in such cases.

VI. FINANCIAL MANAGEMENT PLAN

A. *Risks and Lessons Learned*

- <u>Sufficient resources must be allocated</u> – The sponsor should promote the importance of the NBS project to the ICs and ensure availability of all requisite resources through comprehensive financial planning throughout the life of the project. The ICs must be able to plan for costs to facilitate the availability of resources.
- <u>Budget more for change management and training than you expect to be needed for these activities.</u>
- <u>Budget to fund all full-time positions for NBS team members.</u>

B. *Overview of the NBS Financial Management Plan*

The table below presents the NBS Financial Management Plan. Key issues in developing this plan are as follows:

- It is projected that the implementation will require 3½ years; it is assumed to begin on 1/1/01 and to be concluded on 6/30/04. This implementation period is 6 months longer than assumed during the development of the Business Case. After a detailed analysis of the steps required to implement a project of this size, and of the time required to secure the appropriate level of participation from the NBS Steering Committee, the Functional Advisory Committees and other key participants from the larger NIH community and to implement other aspects of the Change Management Plan, it was concluded that the additional time was necessary.
- Similar to the presentation of the Financial Management Plan in the Business Case, this display is intended to present the total cost of the implementation and post implementation cost of the NBS. All salary costs related to the Project Management Team as well as costs of IC and OD functional experts who serve on the various teams are included. In addition, the costs of the technical team, staffed with CIT technical experts, are also included.
- An eight-year display is again presented so as to be consistent with the display in the NBS Business Case.
- Total costs presented, over the 8-year period is $102.5M, which is a net increase of $8.9M over the amounts presented in the Business Case. The reasons for this increase are explained in Attachment 17. However, it should be noted that this total cost estimate includes $1.5M for an Independent Verification and Validation contract that will be awarded using Program Evaluation funds. Since the development of the Business Case, the Assistant Secretary for Management and Budget placed a condition upon his approval of this project that NIH contract for such assistance; in addition, the CIO Board of Governors has endorsed the use of such contracts for all NIH Enterprise-wide systems.

This budget is based on the assumption that the Phase II Steering Committee will adhere to the principles endorsed by the Phase I Steering Committee. No funds are budgeted for:

- Customizing the NBS ERP software,
- Establishing interfaces or extensions beyond other enterprise-wide systems listed elsewhere in this Plan,
- Expansions in the scope of the project beyond that contemplated in this plan, and
- The purchase of software licenses and associated maintenance beyond the 4,500 that is assumed to be necessary to satisfy the intense users of the NBS.

Listed below is the budget display, and an explanation of each of the items follows the display. A reconciliation of the estimates presented below compared with those presented in the Business Case follows as Attachment 17.

	2001	2002	2003	2004	2005	2006	2007	2008	Total
Program Costs:									
Licenses and Software	$ 1,108,334	$ 1,788,047	$ 2,045,960	$ -	$ -	$ -	$ -	$ -	$ 4,942,341
Maintenance	148,791	578,092	693,592	1,161,160	1,277,276	1,405,004	1,545,504	1,700,054	8,509,473
On-Site Support	242,480	242,480	242,480	169,736	89,111	93,567	98,245	103,158	1,281,257
Gelco Interface	119,227	-	-	-	-	-	-	-	119,227
Hardware	103,000	43,000	43,000	23,000	23,000	23,000	23,000	23,000	304,000
System Integrator	8,010,000	7,750,000	7,750,000	5,068,750	-	-	1,000,000	-	29,578,750
Training	448,511	750,000	720,000	-	-	-	-	-	1,918,511
CIT Operations	1,000,000	1,700,000	1,900,000	2,300,000	2,000,000	1,750,000	1,750,000	1,750,000	14,150,000
IV&V Contract	500,000	500,000	500,000	-	-	-	-	-	1,500,000
Contingency Fund	3,000,000	3,000,000	3,000,000	500,000	-	-	-	-	9,500,000
Subtotal, Program Costs	14,680,343	16,351,619	16,895,032	9,222,646	3,389,387	3,271,571	4,416,749	3,576,212	71,803,559
Operating Costs:									
NBS Staffing Costs	3,852,000	4,840,000	4,835,000	4,556,000	2,933,000	2,911,000	3,028,000	3,149,000	30,104,000
Furniture and Equipment	584,000	-	-	-	-	-	-	-	584,000
Subtotal, Operating Costs	4,436,000	4,840,000	4,835,000	4,556,000	2,933,000	2,911,000	3,028,000	3,149,000	30,688,000
Total, NBS	$19,116,343	$21,191,619	$21,730,032	$13,778,646	$6,322,387	$6,182,571	$7,444,749	$ 6,725,212	$ 102,491,559

[3] The $1.5 million Independent Verification and Validation contract will be awarded with Program Evaluation funds. The total, excluding Program Evaluation funds, is $100,991,569

A description of each cost item in the table above is as follows:

Licenses and Software – Includes the costs for 4,500 Oracle core software licenses and the database software that will support each of the seven administrative and scientific support functions within the scope of the NBS. It also includes the software licenses of the four other "bolt-on" vendors. These costs are based on the actual costs of the Oracle software and database for three years. It also represents actual costs for three of the other four vendors and an estimate of the costs related to the remaining vendor since negotiations are not final. It should be noted that the 4,500 Oracle licenses are expected to satisfy the needs of NIH's "intense" users of the NBS, projected from the users of the ADB. At some point, NIH might wish to purchase additional licenses to support "casual users", i.e., those who might only be interested in utilizing the report capability of the NBS; these costs are not included within the NBS budget and it is assumed that they will be included by ICs and OD Offices in their future budgets.

Maintenance – Provides funding for the yearly fees for the Oracle software as well as the software for the other four vendors. The costs for Oracle for the first three years are based on the negotiated contract; the costs beyond the life of the 3-year contract are based on a written commitment by Oracle. Actual negotiated costs are provided for three of the other four vendors and estimates are provided for the remaining vendor since the negotiations are not final.

On-site Support – Provides funding for an on-site support analyst from Oracle who will assist the NIH in preparing for the installation of the Oracle software and in evaluating the integration of the software of the other vendors; assist the NIH in isolating the potential causes of software/system failure and advise the NIH regarding potential solutions; provide advice and assistance in optimizing the use of Oracle product features; and provide on-the-job training and technical briefings to NBS support staff. The first three years represents negotiated costs; out-year costs are estimates.

Gelco Interfaces – This is the actual cost required to develop interfaces between the Oracle and Gelco software and between the PeopleSoft (EHRP) and Gelco software. Costs for the Gelco software itself and its maintenance are included in the separate "Licenses and Software" and "Maintenance" categories above.

System Integrator – The cost estimates are based on a detailed task and resource analysis over the 3½-year implementation period. System integrator costs can be grouped into three categories: application support, technical support and installation, all of which have been considered in the cost estimate and supplement NIH staffing resources. In addition, the cost estimates include system integrator resources to assist in the development of interfaces between the core software and other NIH enterprise systems. No funds are included to link the NBS to systems other than the enterprise systems identified in the Business Case (ADB, appropriate SSF modules, IMPAC I and II, DHHS Payroll System, DHHS EHRP, DHHS Payment Management System, US Department of Treasury Systems, NIH Data Warehouse, and NIH Status of Funds Database; in addition, an interface will be built to the Intramall, as appropriate, consistent with the e-

procurement strategy developed by the NIH CIO.). Also included in the system integrator cost estimates is the cost associated with installing two software version upgrades, one in 2004 and one in 2007.

Training – These costs are estimated based on two training modes:

- *Training provided by the software vendors* – Implementation team members usually go through three rounds of training, beginning with an overview class at the start of the project and continuing with more specialized classes at different points throughout the implementation. In addition, other participants in the overall project such as members of the Functional Advisory Committees, the Project Management Team and the NBS Steering Committee would benefit from overview training. Funding for this training is based on the amount contained in the contract with Oracle as well as estimated training needs for the other 4 software vendors.

- *End-user training developed by the implementation team and administered by a central mechanism* – End-user training is limited to the needs of end-users to perform day-to-day operations within their functional area. End-user training is unique to the NIH as it teaches NIH-specific business rules and use of data. Training materials are, therefore, developed by the implementation team and are based on predefined training templates using the system integrator's methodology. The proposed training approach for end-users at the NIH is to include the software end-user training into the overall functional training courses provided by the Human Resources Development Division (HRDD) or some other central mechanism.

In addition to the training budgeted in this line item, significant training of the implementation teams will occur through knowledge transfer from the system integrator. The most intense training for the implementation team is working with the system integrator to simulate business processes using the software on a day-to-day basis. This training mode is an inherent part of implementing the NBS using pre-existing process scripts, product documentation based on the system integrator's methodology and configuring the software itself. The funding for this type of training is included within the system integrator costs above.

CIT Hardware and Operations – This cost category includes CIT estimates for all "backend" server hardware, hardware maintenance, 7x24 system operation and support, Tier 1 helpdesk support, desktop computer and LAN support for NBS team members and conference room pilots, and related staffing.

IV&V Contract – An Independent Verification and Validation contractor will monitor the overall implementation effort. The tasks that will be assigned to this contractor, who will report to the NBS Project Manager and the co-chairs of the

Steering Committee, is described more fully in the Project Monitoring and Evaluation Plan. Program Evaluation funds will be used to finance this contract.

Contingency Fund – A Contingency Fund of $9.5M is projected, the same as that projected in the Business Case. Examples of the types of circumstances that might require the use of a Contingency Fund include:

- Costs that might be required to configure and install client-server software modules in NIH users' workstations in cases where pure web access is impractical.

- Costs possibly required to customize the software to meet the requirement to process sponsored travel requests in which there are multiple sponsors. This was the single major NIH requirement not satisfied by the commercial software products that were evaluated.

- Costs related to implementing NIH's eProcurement strategy. CIT is in the process of developing an eProcurement strategy and the final plan may incur additional licensing and implementation costs.

The budgeting of a contingency fund, given the potential uncertainty in a project of this magnitude, even with the best of planning, is prudent. However, it should be stressed that the contingency fund is to be used only for unexpected circumstances that occur within the scope of the project. It is not to be used to expand the scope of the project. In addition, any use of the contingency fund must be approved by the Steering Committee.

NBS Staffing Costs – Estimates include operational resources required to implement and support the NBS. This includes the Project Management Team and Functional Team members (i.e. a financial management team, a property team, etc.) composed of current OD and IC employees, and a Technical Team composed of CIT employees. Most of these individuals are assumed to be existing NIH employees that could either be detailed from their current position or could become employees of the NBS but, consistent with the experience of many of the Universities consulted, funds are proposed for the full complement of positions so that an IC that details an employee can be reimbursed. In addition, funds are also included to support the Technical Team whose members will be under the direction of the Project Manager but will remain as CIT employees. As functions are deployed, and become stable, a sub-set of the implementation team will move into a "Competency Center" to support, maintain and refine the NBS. The Competency Center will be responsible for continuing support for reporting, documentation, workflow, and will operate an NBS helpdesk.

NIH FTEs that are projected over the total eight-year period for both implementation and the Competency Center are displayed in the table below:

	NIH FTE's							
	FY 2001	**FY 2002**	**FY 2003**	**FY 2004**	**FY 2005**	**FY 2006**	**FY 2007**	**FY 2008**
Functional Teams	12.17	17.75	15.75	11.25	-	-	-	-
Technical Team	4.75	6.00	6.75	6.00	-	-	-	-
Project Mgmt. Team	8.50	10.00	10.00	7.50	-	-	-	-
Competency Center	-	-	-	5.25	18.75	18.00	18.00	18.00
Total	25.42	33.75	32.50	30.00	18.75	18.00	18.00	18.00

Furniture and Equipment – Funds are included to provide for the one-time cost of furniture and equipment for the Project Management, Functional and Technical Teams.

The time spent by other NIH staff who may devote small portions of their time to NBS matters in NBS workshops and IC specific activities has been excluded due to the fragmented and unpredictable nature of such activities. Although small groups may be required to assist the project team in a focused fashion over short periods of time, these costs are small.

Business Case…………………………………….………..$93.6 M
 + Extension of Implementation from 3 to 3½ years….…………+ 5.2
 + IV&V Contract……………………………………….………+ 1.5
 + CIT Hardware and Operations………………….....………..+ 1.1
  + Software Contracts…………..…………….….…………+ 0.6
  + Other……………………………………………………..+ 0.5
Implementation Plan………...………………………………..$102.5 M

Extension of Implementation from 3 to 3½ years – A detailed analysis of the implementation tasks led to the conclusion that, while the technical issues related to implementation could be accomplished within 3 years, it was unlikely that it would allow time for sufficient community involvement and other change management requirements. Extending the System Integrator contract and NIH staffing costs for another half year requires an additional $5.2M.

IV&V Contract – Subsequent to the presentation of the Business Case, the ASMB approved the NBS Project with the condition that an IV&V contractor independently monitor the implementation; the CIO BOG has also endorsed the use of such contractors for NIH enterprise-wide systems. This contract is estimated at $1.5M and will be awarded with Program Evaluation funds.

CIT Hardware and Operations –. The increase of $1.1M results principally from hardware maintenance costs inadvertently not budgeted in the Business Case that will be provided by CIT to the NBS project. These maintenance costs are partially offset by lower estimates by CIT for hardware and operations support, resulting in a $1.1M net increase.

Software Contracts – The final negotiations with the software vendors conducted to date, and their projected out year costs, has resulted in a net increase of $0.6M over the amounts estimated in the Business Case. This is primarily the result of Oracle on-site support costs and higher-than-expected maintenance costs in the out-years, partially offset by lower-than-projected costs for software licenses.

Other – This includes increases in NBS staffing costs and the cost of building the Gelco travel interfaces with Oracle and Peoplesoft EHRP.

VII. PROJECT MONITORING AND EVALUATION PLAN

A. Risks and Lessons Learned

- Use milestones as part of the project control process – Milestones will allow the NBS team to efficiently track the achievement of major deliverables and functionality to be deployed in appropriately spaced intervals.
- Abandon traditional large-scale project implementation methods for a "time-box" approach – Decompose the project into smaller projects that can be delivered within the overall IT architecture and within a 6-9 month period.
- Manage contractors on "earned value" principles – Undertake tracking of costs and time and take definitive action should either exceed 10% of that planned.
- Define objectives and goals to align with the NIH strategic plan.
- Adopt a balanced scorecard approach to project evaluation.

B. Overview of the NBS Project Evaluation Plan

This section summarizes the proposed approach to both monitoring the performance of the System Integrator in assisting NIH with the implementation of the NBS, and the development of a system of performance measures and the application of those measures to assess the success of the NBS in achieving its objectives.

Project Monitoring

OMB Circular A-11 unifies the capital asset management and reporting requirements of the Government Performance and Results Act (GPRA), the Federal Acquisition Streamlining Act of 1994 (FASA), and the Information Technology Management Reform Act (ITMRA). FASA, in particular, requires that Federal agencies assess performance and schedule attainment as well as acquisition and implementation costs of programs, and on average, achieve 90 per cent of the cost and schedule goals established for the programs. Consistent with this legislation and overall government policy, the DHHS has taken a leadership position in promoting an "earned value" methodology[4] to encourage contractors to effectively manage costs and schedule.

Given the cost and complexity of this project, the NBS Project Team will implement an "earned value" methodology in its oversight of the System Integrator. The NBS Project Management Team will design a process that identifies the individual tasks required to implement the NBS as well as the costs and the time required to complete each of those tasks. Information will then be collected on the cost and time required to complete each of those tasks by the System Integrator. Regular reports will be provided to the NBS Steering Committee that analyze the planned and actual time and costs. Corrective action will be taken, as necessary, but definitive action will be taken should the analysis indicate

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[4] The Department of Health and Human Services defines the earned value methodology as "A management technique that relates resource planning to technical, cost and schedule requirements. All work is planned, budgeted, and scheduled in time-phased "planned value" increments constituting a cost and schedule measurement baseline."

a slippage of 10% in either the cost or schedule requirements. Exceeding this threshold will also trigger notification of the DHHS ITIRB of such slippage as well as the corrective action to be taken. The following steps have been, or will be, taken to establish this system, as well as to have the contractor assume risk should milestones not be met:

1. Include a requirement for reporting the achievement of cost and schedule milestones according to performance-based management practices, as well as risk sharing, as part of the Systems Integrator acquisition planning process.

2. Design a data gathering and analysis process that will result in management-level presentation of the submitted reports.

3. Design a feedback loop that will incorporate the measurement results into a tracking system that can easily display variance from schedule or budget, and alert the NBS Steering Committee if the variance exceeds 10%.

4. Establish a process for a periodic review of the measurement results by the Steering Committee.

5. Prepare a written report summarizing this activity and presenting recommendations for consideration by the NBS Steering Committee.

To date, actions have been taken with regard to Item 1. The Request for Quotations, issued 9/27/00, included these requirements that potential bidders for the System Integrator award must address:

- *The methodology proposed must include a performance-based management system (e.g. earned value) that would track milestones, cost, schedule and performance requirements.*
- *As evidence of its commitment to share the risk with the Government in implementing the NBS, the vendor shall propose a methodology by which its performance can be measured. The methodology should include appropriate positive monetary incentives when performance objectives exceed expectations and negative monetary incentives when performance objectives fail to meet expectations. Examples of performance measures might include adherence to milestone schedules, error rates, and levels of customer satisfaction. Examples of monetary incentives might include lump sum amounts and variances in the vendor's GSA FSS Group 70 labor rates.*

In addition, the Statement of Work, issued 9/27/00 included these statements:

- *The contractor shall prepare a Project Plan describing the technical tasks, milestones, organizational resources and performance-based management system (e.g. earned value) management controls to be employed to meet the cost, performance and schedule requirements throughout task order execution.*

- *Reviews must not only report progress, but also continually assess the overall prospects for effective completion of the work comprising the Project Plan. Additionally, reviews shall address the financial status of the project, as well as any outstanding problems and issues and the nature and status of their resolution.*
- *The contractor shall link work accomplished to project milestones by the labor hours budgeted, expended, and projected, and submit the information in an Invoice Report… with each invoice.* A sample of the invoice that links effort to each task is shown as Attachment 18.

The remaining steps listed above will be completed prior to the start date of the System Integrator contract.

In addition to this formal monitoring by the Project Management Team, the NBS Project Manager will utilize the services of an independent verification and validation (IV&V) contractor. This contractor will report to the NBS Project Manager and the co-chairs of the Steering Committee and will provide an independent assessment of the progress of the implementation effort to ensure that issues are surfaced and addressed quickly. The key components of the independent verification and validation effort will be to:

- Predict, assess and document the extent to which the NBS project meets planned schedules and budget by reviewing, inspecting, and testing project deliverables to assure that software, services, documents or other products conform to specific requirements, are delivered as planned.

- Predict, assess and document the extent to which the NBS system effectively meets users' and legislative needs, by evaluating the configured, installed system against the performance criteria established for the project.

It is anticipated that a Statement of Work will be issued by February 2000 and an award is projected to be made in approximately 3 months from issuance.

Performance Measurement

Performance Measurement[5] is defined by the General Accounting Office (GAO) as the ongoing monitoring and reporting of accomplishments, particularly progress towards pre-established goals. Performance measures may address the program activities (process), the direct products and services delivered by a program (outputs), and/or the results of those products and services (outcomes). GPRA specifically requires outcome-oriented performance measurement systems, and specifically applies to information technology and improved mission achievement.

In order to develop a comprehensive program of performance measurement, the NBS Project Office has contracted with Condor Technology Solutions, Inc. and Grant Thornton, LLP for management consulting services to design a process to identify and apply performance measures so as to assess the success of the NBS in achieving its

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[5]Quoted and extracted from: United States General Accounting Office, Performance Measurement and Evaluation, April 1998, GAO/GGD-98-26.

defined goals. The NBS Project Management Team will conduct five planning sessions, each with participation and facilitation from the evaluation consultant. These meetings will be constructed according to the agenda detailed below with the intention of developing a balanced scorecard (BSC) methodology. A discussion of the BSC methodology is shown as Attachment 19.

1. Review the legislative requirements for performance based management of IT projects, and the DHHS ITIRB requirement that NIH shall provide documentation regarding the development of performance measures and the use of performance measurement as a means of evaluating efficiency, effectiveness, and results. This shall include program accomplishments in terms of outputs (quantity of products or services provided) and outcomes (results of providing outputs in terms of effectively addressing intended agency mission objectives).

2. Analyze policy guidance available from OMB, DHHS, or other agencies that might provide guidance on developing metrics.

3. Review the NIH GPRA Plan to identify relevant NIH-wide goals and metrics that can be supported by the project.

4. Discuss and review pertinent experience from other organizations as they pursue large IT investment activities, with particular concentration on academic or government activities.

5. Identify a set of assumptions, objectives and goals that:

   - Demonstrate the payoff of the new investment by implementing the best practices.

   - Link to the NIH GPRA plan.

   - Relate to the outputs and performance of the existing processes and systems.

   - Represent the different facets of the project including progress milestones, financial achievement, customer satisfaction and project staff (the "Balanced Scorecard").

6. Refine standard BSC Categories and Critical Success Factors in terms applicable to NIH.

7. Assemble the assumptions, objectives and goals into a statement of what will constitute a successful NBS project. Many of the administrative and scientific support goals established earlier in Phase I, together with the assumptions and further objectives presented in the Business Case, can be used for this purpose.

8. Prioritize objectives and goals into two levels of importance and focus on the more critical, i.e., "the vital few".

9. For each objective, define measures. This step will involve consideration of the data collection, storage and analysis mechanisms that will be needed. A mixture of qualitative and quantitative metrics will likely provide a better mix of perception and objectivity. Surveys may be necessary tools when gauging customer attitudes.

10. Design a data gathering and analysis process that will result in reports of the measurement results.

11. Design a feedback loop that will incorporate the measured results into future management decisions.

12. Establish a process for an annual project review by the Steering Committee.

13. Prepare a written report summarizing this activity and presenting recommendations for consideration by the NBS Steering Committee.

An award to Condor Technology Solutions, Inc. and Grant Thornton, LLP was made on 10/27/2000 and the planning sessions will be completed by 1/1/01. Draft performance measures will be developed by 1/31/01 for consideration and further refinement by the functional teams, the Functional Advisory Committees, and the NBS Steering Committee.

Attachment 18 – Sample Invoice from System Integrator

Invoice Report
GSA FSS Delivery Order Number
Invoice Period of Performance
Date of Report:

Milestone:

(a)	(b)	(c)	(d)	(e)	(f)	(h)	(i)	(j)	(k)
Item No.	Labor Category	Labor Hours Expended This Period	Labor Hour Rate ($)	Total $s Expended This Period (c) x (d)	Cumulative $s Expended to Date	Projected $s Through End of Contract	Total $s Negotiated	Variance ((i) - ((f)+(h))	Notes

The balanced scorecard (BSC) provides a structured methodology for considering four perspectives important to any organization, program or project. The four areas are generally presented[6] as four perspectives:

- Financial Perspective – in the Federal (NIH) context, the financial perspective relates to the construction and adherence to an efficient budget, and delivery of the predicted benefits and savings.

- Customer Perspective – this measures the satisfaction of those who directly or indirectly use the NBS administrative and scientific support functions.

- Internal Perspective – this perspective relates to the achievement of milestones that mark the progress of the project.

- Learning Perspective – this perspective measures success in increasing the skills of NIH staff, and in fostering experience and abilities that help them grow, improve, and better support the NIH from a stable platform of career satisfaction.

By assessing all four areas, NIH can avoid confusing project milestone achievements with effective project outcomes. The approach can discern if a project is achieving budget compliance, but at the expense of overworking a disgruntled staff. The four perspectives help monitor current performance (project progress, budget, end-user satisfaction) and efforts to build infrastructure, to motivate and educate employees, to improve process, to learn and innovate.

A simple example of the four perspectives comprising a NBS balanced scorecard with a typical performance objectives and performance measures for each is displayed below.

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[6]Gendron, Marie. Using the balanced scorecard, Harvard Management Update: A Newsletter from Harvard Business School 2, no.10 (October 1997): 7-10.

Balanced Scorecard Objectives and Measures

Financial Perspective

Objectives	Measures
Project delivers anticipated benefits	Value of goals/objectives predicted by the business case and achieved by the project

Learning Perspective
(Developing an innovative, learning environment)

Objectives	Measures
Project is creating a competent, stable core staff	•Employee satisfaction index •Employee turnover rate by performance category •# of cross-trained employees available as backup •Level of training achieved by employees

Customer (User) Perspective
(Is the system effective?)

Objectives	Measures
NIH business processes are improved	Number of identified Best Practices adopted
The NBS is an effective tool	•Number of active users •User/ Stakeholder satisfaction index (perceived value of the NBS)

Internal Perspective
(Earned Value Analysis)

Objectives	Measures
Project is achieving the milestones	•Implementation Milestones Met/Unmet/Modified/Abandoned with variance of less than 10%
Outlays match project budget	Actual obligations track planned budget with a variance of less than 10%

VIII. ACQUISITION STRATEGY

A. *Risks and Lessons Learned*
- Select bolt-ons from business partners of the prime ERP vendor.
- Use milestones as part of the project control process – Milestones will allow the NBS team to efficiently track the achievement of major deliverables and functionality to be deployed in appropriately spaced intervals.

B. *Overview of the NBS Acquisition Strategy*

Oracle ERP Software – As noted in the Business Case, the NIH strategy for identifying the primary software vendor was to utilize the General Services Administration's (GSA's) Federal Supply Schedule (FSS) ordering procedures that expedite the procurement process. Vendors that were invited by NIH to compete for the NBS ERP software requirement had to offer a product whose financial management software had been certified by the Joint Financial Management Improvement Program (JFMIP) to assure receipt of a product meeting Federal financial management standards and requirements.

Potential vendors were assessed by a two-step process. They were assessed first to assure an integrated product, experience in the public sector, and demonstrated capability to serve large organizations with high transaction volumes and a diverse number of business processes. Following this analysis, the NIH invited proposals from four GSA FSS vendors and, following an extensive analysis, an award was made to Oracle, Inc., whose proposal was the lowest overall cost and received the highest score following the evaluation process.

This contract has been structured as a fixed price Delivery Order with options so as to limit the Federal government's financial exposure, should difficulties be encountered. While the budget that is listed in Section VI, Financial Management Plan, contains a total of $5.6M over the 3-year life of this contract, it is structured so that the base award is only $619,200. This base award will support the purchase of the first 100 of the planned 4,500 licenses and associated software maintenance, as well as training and one year of on-site support by Oracle. The incremental purchases of the remaining 4,400 licenses and associated maintenance as well as continuing on-site support are listed as contract options that are exercised at the discretion of the NIH. The NBS Project Office will exercise these options only after authorization by the NIH NBS Steering Committee. It should be noted that this phased approach to purchasing the software licenses did not increase the overall cost.

It should also be noted, and is mentioned in the Financial Plan, that the 4,500 licenses that are being purchased will satisfy the needs for those NIH employees that will be intense users of the NBS, i.e., budget and finance staff, administrative officers, etc. This estimate has been extrapolated from the current users of the ADB. However, it is likely

that many additional employees may want to utilize the reporting capability of the NBS, i.e., be "casual" or occasional users. If the NBS is successful, and its capabilities are fully utilized, there will be a significant number of occasional users. However, this number is unknown at this point, and cannot be reasonably projected as it may vary considerably by IC or OD Office. Therefore, any additional purchases of software for occasional users will occur outside of the scope of this contract, and will be financed directly by the IC or OD office, although the NBS Project Office would be pleased to coordinate such purchases to assure the most competitive price.

The Oracle ERP software will be used for the Financial Management, Property, Acquisition, R&D Contracts, Supply, and Service and Supply functions and will contain an interface with the PeopleSoft Human Resources system, i.e., EHRP, being developed by the DHHS Human Resources community. In addition to the Oracle ERP software, the NIH is also purchasing 4 additional pieces of software (or "bolt-ons") and associated software maintenance and training from vendors whose products were proposed by Oracle, as part of its ERP software solution to satisfy NIH's requirements. Each of these is listed below and will be purchased by NIH on a fixed price basis with options. Purchases of the Compusearch software products will be made incrementally over the implementation phase so as to limit the government's risk, should problems be encountered. However, the Datastream and Gelco products will not be purchased incrementally because, given their pricing structure, it is not advantageous to the Government to do so. Final negotiations with BPA have not been conducted but incremental purchases are planned.

Gelco Information Network, Inc.'s Travel Manager – this software will satisfy all travel function requirements developed by the functional workgroup except where there are multiple sponsors of a trip. It combines automated travel regulations, Federal government forms generation, and electronic document processing into one piece of software. None of the ERP vendors that were evaluated had the capability to administer Federal travel requirements within its basic software. The software licenses and associated maintenance and training will be purchased by utilizing expedited Federal commercial item acquisition procedures.

Datastream Systems, Inc.'s Enterprise Asset Management – this software will allow NIH to track maintenance agreements and to maintain repair records on equipment that has been purchased by NIH. This requirement had been established by the functional workgroup. Oracle does not have this capability incorporated into its basic software. The software licenses and associated maintenance and training will be purchased by utilizing expedited Federal commercial item acquisition procedures.

BPA Systems – this software will provide the capability to download information captured by hand-held bar-code scanners. This is a requirement established by the functional workgroup that will facilitate the supply management and property inventory process. Oracle does not have this capability incorporated into its basic software. The software licenses and associated maintenance and training will be purchased by utilizing expedited Federal commercial item acquisition procedures.

Compusearch Software Systems, Inc. – this software will provide a Federal contracts document-generating system with Federal Acquisition Regulation citations and workflow tracking capabilities. This capability was a requirement established by the NBS functional workgroups. Oracle does not have this capability incorporated into its basic software. The software licenses and associated maintenance and training will be purchased via the GSA FSS.

Each of these vendors is a business partner of Oracle. Interfaces between Datastream, BPA, and Compusearch already exist so that no additional expense will be incurred for their development. An interface with Gelco does not exist, either with Oracle or the PeopleSoft EHRP product. In order to limit NIH's financial risk, however, Oracle and Gelco agreed on a ceiling amount that NIH would pay for that interface and these costs are identified, and discussed in the Financial Plan.

Every effort has been made to reduce the risk inherent in managing the integration of the products of five different vendors. As previously noted, each of the 4 vendors with specialized products has a business partner relationship with Oracle. In addition, efforts were made as part of the contract negotiations to emphasize the expectation by NIH that Oracle will coordinate issues among the four. While each must necessarily be responsible for resolving problems related to its own software, Oracle will coordinate problem resolution with all issues related to their ERP solution and will, where appropriate, pressure their partners to initiate problem resolution. Oracle will conduct a test of Oracle, Datastream, BPA, Gelco, and Compusearch to demonstrate the integration of the products. In addition, Oracle will provide an Operational Readiness Assessment prior to deployment by reviewing the configured software and the proposed operational environment to identify problems that may impede integration or affect NIH service priorities and to identify system parameters that may require change.

System Integrator Contract – To assist NIH in accomplishing the project's objectives, NIH will contract with a System Integrator for both advisory and participative services. The contractor will provide expertise in the ERP software product and its installation, configuration and customization; in software, hardware and business systems architecture; and in business process change management. The contractor will provide experts to assist in specification and set-up of hardware and software, to facilitate government teams of functional experts, to configure the Oracle solutions, to write and test new application interfaces, and to assist in change management activities. A competitive contract will be awarded to one of the 8 vendors that currently offer such services through the GSA Federal Supply Schedule.

A request for quotation was issued to these vendors on September 27. As is the case with the software contract, steps are being taken to limit potential risks to NIH of cost overruns or other contractual difficulties. As mentioned in the section on Project Monitoring and Evaluation, the contractor will be monitored by the PMT through a performance-based management system (e.g., earned value) to assure that cost performance and schedule requirements are being met throughout the project. This will

assist the NIH in overseeing this project and provide an early warning should the project begin to encounter difficulties in adhering to the projected schedule and budget. The NBS Steering Committee will regularly review the results of this management system. In addition, a DHHS Information Technology Investment Review Board (ITIRB) review will be required if it becomes apparent that either the project costs or schedule deviates by more than 10% from the baseline plan.

In addition to this monitoring system, the NBS Project Office is also exploring mechanisms that would allow the System Integrator to share in the risk in the event of cost or schedule overages, and also to share incentives for superior performance. Again, as previously mentioned in the Project Monitoring and Evaluation section of this plan, the Statement of Work asks potential contractors to submit proposals based on "risk-sharing". Examples of performance measures might include adherence to milestone schedules, error rates, and levels of customer satisfaction. Examples of monetary incentives might include lump sum amounts and variances in the vendor's proposed labor rates.

Independent Verification and Validation – The final element in the overall risk mitigation strategy is to hire an Independent Verification and Validation (IV&V) contractor. The tasks that will be assigned to this contractor, who will report to the NBS Project Manager and the co-chairs of the Steering Committee, is described more fully in the Project Monitoring and Evaluation Plan. Such a contractor will likely be selected from a GSA FSS as a competitive delivery order for the duration of the NBS implementation.

APPENDIX A – UNIVERSITY INTERVIEWS

Summary of ERP Project Organization for Selected Universities

	Stanford	Yale	U of NB	Cornell	Ohio State	Harvard	JHU
Executive Sponsors	Provost & CFO	Provost & CFO		Senior Vice President	Provost & CFO	Provost	VP for Business Affairs
Steering Committee	Chair – Senior position from Schools Members– Academic Deans and Senior Business Officers (60/40 mix in favor of Schools) Policy made by SC Working level committee for each function (also 60/40)	Co-chairs – Provost & CFO Members – 2 Assoc. VPs, Directors of Centralized Services; Medical School rep. Policy made by SC	Members – University VP for Business and Finance; Chief Business Officers of each campus; CIO Policy made by SC Also have a working level committee (majority are campus level, not University level)	Members - VP for each business area SC does not make policy Also have working level committee	Co-chair – Provost & CFO Members - 3 Deans, CIO, Business Owners Policy made by SC Also have working level committee	Chair – CIO (was VP for Finance when financials being designed) Members – Central Admin. Senior Staff, Senior College Administrators Policy made by existing committees, not SC	Co-Chair – VP for Business Affairs; CFO Members – Senior Business Officers of Divisions, CIO Policy made by SC
Project Manager: FT vs. PT Inhouse vs. New Hire	FT New Hire	FT New Hire	FT In-house	FT	FT New Hire	FT In-house	FT New Hire
Functional Team Leads: FT vs. PT Previous Position	FT Technical expert reporting to functional head and PM	FT Functional Heads	FT Mix of functional heads/ middle managers	PT Functional Heads	FT Middle Mangers	FT Middle Mangers	FT CFO employees
Functional Team Members: FT vs. PT	FT	FT and PT (80% time)	FT but also had extended teams that are PT (50-80% time)	PT	FT	FT and PT	PT but worked every day on project

	Stanford	Yale	U of NB	Cornell	Ohio State	Harvard	JHU
Backfill positions	Yes – but job guarantees for members not important since they are more marketable	Yes – on a temporary basis	Varied by campus	No	Yes-individuals guaranteed a position but not same position	Yes	Yes
Technical Team Lead: FT vs. PT Reporting Relationship	See Functional Team Lead	FT Project Manager	FT Project Manager but also is Assoc. Dir. of Central IT Org.	Project Manager	FT Project Manager	FT Project Manager	Each team had 2 FT technical people; Asst. Dir. for MIS worked PT on project
Change Mgmt	Functional Teams	Dedicated Team	Dedicated Team	Dedicated Team	Dedicated Team	Functional Teams	Contractor
Lessons learned	1. Go "best of suite" and do not customize. 2. Must be run by functional experts. 3. Define success. 4. Change management skills more important than technical skills. 5. Have strong decision making process. 6. Exercise scope control.	1. Deliverables must be clearly identified. 2. System Integrators must be integrated into the Project Management Office.	1. Functional experts should direct project. 2. Top leadership must drive project. 3. Avoid customization. 4. Exercise scope control.	1. Majority of team members should not be CO. 2. Team members should be FT; budget for backfill. 3. Technical deadlines inappropriately drove project; 4. Use real data, not test data ; 5. Nominations for team members did not produce best talent. 6. Manage expectations.	1. Create strong SC to make rapid decisions. 2. Use best people and create incentives to retain them. 3. Exercise scope control. 4. Avoid customization. 5. Leave plenty of time for testing. 6. Change will be hard – involve users in design and testing. 7. Build core staff.	1. Need top-level commitment to make decisions/ force changes. 2. Most disruptions due to change management, particularly changes related to process and policy. 3. Nominations did not yield best end-users. 4. Communication is essential. 5. Build core staff. 6. Difficult to use MACs with Oracle. 7. Manage expectations	1. Focus on purification of data. 2. Training is essential – but it was difficult for schools to volunteer time for training. 3. Most disruptions due to change management. 4. Strong decision-making structure is essential.

APPENDIX B – LITERATURE SEARCH[i]

Critical Success Factors – A Consensus[ii]

1) **The same key factors are characteristic of a successful implementation.**

A conference of experienced ERP practitioners held at the University of Memphis, in April 1999, concluded that this list of factors summarized a successful ERP implementation.

- Visible sponsorship from the top of the enterprise

- Motivation: must be driven by a strategic business (not IT) initiative

- Obtain buy-in from key business stakeholders

- Use a multi-disciplinary, business-leader focused team

- Include at the heart of the team people who have previously implemented ERP (usually consultants)

- Co-locate the implementation team

- Expect roadblocks and disagreements; resolve them in a timely manner

- Provide for change management and training; budget more than you expect for these activities

- Avoid ERP customization

- Communicate, communicate, communicate

ERP – The role of the IT Function[iii]

2) **The need to identify and build key in-house core IT capabilities… emerges as one of the critical – and neglected – success factors.**

The "Communications of the ACM", a journal for IT professionals, bases their conclusions on first hand experience as well as on a 1999 survey of 24 ERP implementation projects worldwide. The authors develop nine core IT capabilities. The first five appear relevant to NIH; the next four may be based on a broader definition of IT (more relevant to a commercial enterprise) than is currently recognized at NIH.

- *IT leadership* to devise the strategy, structures processes and staffing to ensure the IT function delivers value for the money.

- *Business systems thinking* to ensure IT capabilities are envisioned in every business process.

- *Relationship building* to establish understanding, trust and cooperation among the business users and IT.

- *Architecture planning* to create the technical platform to meet current and future business needs.

- *Technology fixing* to rapidly troubleshoot problems and to create workable IT solutions to business needs.

- *Informed buying*

- *Contract facilitation*

- *Contracts monitoring*

- *Supplier development*

3) **Abandon traditional large-scale project implementation methods for a "time-box" approach characterized by four main components.**

- Adopt a user-based (business) focus for the project, in place of an IT specialist focus

- Adopt a governance structure, with a high level sponsor and a project champion from the business, not the IT side

- Adopt a time-box philosophy – decompose the project into smaller projects that can be delivered within the overall IT architecture and within a six- to nine-month period

- Make use of external expertise, but only as an adjunct resource to an in-house team

ERP doesn't end with implementation"[iv]

4) **Plan for a transition of the implementation team to post-implementation roles.**

The post implementation period brings challenges that should influence the pre-Implementation Planning. Experienced ERP implementers say that the period just following the implementation often presents real conflicts. The enterprise is anxious to dissolve the implementation team, users enter a period of maximum learning and new requirements generation, requiring a lot of help from the team, and the team itself ponders a return to old jobs that seem boring by comparison. Into this chaos come the headhunters, offering increased salaries, new challenges and a fresh start at a new implementation.

A Guide to Successful Implementation[v]

5) **A veteran consultant, experienced in ERP implementation, offers these rules for a successful project.**

- Select the right package – one that maps well to your needs

- Keep management's participation active – the implementation workshops, meetings and demonstrations are actually more important than the other items on managers calendars. Managers cannot become detached.

- Assign the best people full time – A general rule is that the more indispensable someone is to a company's routine operations, the better candidate is for a key role on the implementation team. Fight the tendency to accept people who will not be sorely missed from their core function!

- Implement effective change management

- Demand minimal customization

- Document everything

- Use consultants to supply experience with ERP implementation

- Mange expectations

Lessons from the failed Hershey Foods Corp. ERP implementation[vi]

6) **Understand the implications of customizing the (ERP) software.**

However tempting it may be to preserve specific business processes by altering the software code, customization almost always means trouble. "Modify the code as a last resort".

7) **Make sure an ERP system is right for your "company".**

Before embarking on an ERP project, senior managers must assess whether they can—and want—to standardize business processes around one common template.

8) **Control your internal politics.**

Department heads are sure to present excellent reasons why the new system won't work. …an ERP implementation is as complicated as new plant construction…CEOs and CFOs have to visibly support and monitor progress of the project.

Lessons From Oakland, California[vii]

9) **Everyone will need more training than you thought necessary.**

The city enjoyed a successful implementation of Oracle Corporation's ERP product, but learned the hard way that it had not trained its employees well enough. Slow adoption of the new system caused payroll clerks to run out of time entering needed data into the new system, and resulted in missing or incorrect paychecks.

Managing "Bolt-on" ERP extensions[viii]

At Jefferson Health Systems, in Radnor, Pennsylvania, an on-going implementation of PeopleSoft constantly tests interfaces to "bolt-on" systems for operating room scheduling, specialized patient accounting, and time and attendance for nursing. From Domino's Pizza, also implementing PeopleSoft and integrating products from Kronos, Manugistics, and others: "…start the process of both integration and data conversion very early." PC Connection, Inc. strove to select "tried and true, financially stable" bolt-on vendors that already had big installed bases for their products.

10) **Go "vanilla" in your ERP implementation, that is, don't get tricky. Modifications make upgrades problematic.**

11) **Stay up-to-date on all applications. The trade-off is money; keeping current can be expensive.**

12) **Select bolt-ons from business partners of the primary ERP vendor.**

13) **Keep the cross-functional teams together after the initial implementation; keep testing the integration links "like crazy".**

Lessons from the Mint[ix]

14) **You cannot do everything at once.**

"What you discover is that the requirements for timely, reliable data in the organization are far greater than you can possibly ever meet, especially over the short to middle term. So you have to make tough choices among… financial management, human resources, procurement demands. All those are competing for dollars, yes, but especially for talent."

15) **There are unintended consequences to changing the code (customizing the ERP package).**

."…government agencies have typically evolved their own business processes. It (ERP) is shock treatment because agencies … have to make decisions about how they will conform the business processes to fit the ERP, when they feel like they must change the ERP. That is a very slippery slope.

There are unintended consequences to changing the code. You threaten the viability of upgrades to the software."

[i] As of July 2000.

[ii] ERPs: Plenty Of Critical Success Factors, Robert Glass, The Software Practitioner, republished by TechRepublic, November 1999.

[iii] The Role of the IT Function, Leslie Wilcocks and Richard Sykes, Communications of the ACM, April 2000.

[iv] The Most Important Team In History, Christopher Koch, CIO Magazine, October 15, 1999

[v] A Manager's Guide to Successful ERP Implementation, Harry Hanelt, KPMG Internal Publication, August 1999.

[vi] Blaming ERP, CFO Magazine, January 2000.

[vii] Planning, training woes hit ERP project at city of Oakland, Craig Stedman, Computerworld, December 10, 1999.

[viii] The Ties that Bolt, CIO Magazine, April 1999.

[ix] Agencies are Ready for ERP Challenge, Philip N. Diehl (Former Director of the Mint), Government Computer News, May 8, 2000.